ACADEMIC REGULATIONS, PROGRAM STRUCTURE AND SYLLABUS (DR24)

CIVIL ENGINEERING

For

(Applicable to the batches admitted from (2024-25)

(I To IV Semesters)

D N R COLLEGE OF ENGINEERING & TECHNOLOGY

(Autonomous)

Approved by AICTE, New Delhi & Permanently Affiliated to JNTUK, Kakinada

Accredited by NBA (B. Tech – CSE, ECE & EEE) & NAAC with A++ Grade

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ABOUT D N R COLLEGE OF ENGINEERING & TECHNOLOGY

Dantuluri Narayana Raju College (D.N.R) was established in 1945, before India got Independence, and was an offshoot of the National movement and renaissance thinking. Being agrarian, the Godavari region had been kept out of the higher education in the Pre-Independence period. Sri Dantuluri Narayana Raju, a freedom fighter, an activist and a visionary wanted to provide the uneducated rural masses with the hither to unthinkable and unreachable source for their overall development and welfare i.e. higher education. That visionary, with the help of a limited number of committed lieutenants and Philanthropists, strived hard with a missionary zeal and realised the establishment of a college at Bhimavaram, Known as West Godavari Bhimavaram (W.G.B) College in **1945.**

In 1964 it was renamed as Dantuluri Narayana Raju (D.N.R) College in memory of its founder. Under this premier association DNR College of Engineering & Technology was established in the year 2010. DNRCET offers B.Tech programmes in Civil Engineering, Electrical and Electronics Engineering, Mechanical Engineering, Electronics and Communication Engineering and Computer Science Engineering and allied branches, Four M Tech Programmes in the Civil Engineering, Mechanical engineering, Electronics and Communication Engineering and Computer Science Engineering.

The institute has been running successfully with the support of well qualified and committed faculty for the last nine years serving the needs of the people in and around this area besides extending the hands to other districts also. The college has a motto of providing quality engineering education through well-defined teaching learning methodologies following by the curriculum of JNTUK, Kakinada in a highly disciplinal environment.

The DNR College of Engineering & Technology is also conducting several training programs, workshops, expert lectures, awareness programs etc, in different disciplines for facilitating the students to face the interviews by the time they complete their graduation.

Apart from the technical programs mentioned above, the institution is also serving the society by different means through its NSS unit. It is a great privilege that many students have membership in technical bodies like ISTE & CSI. The dedicated placement cell regularly conducts grooming sessions making students industry-fit.

VISION & MISSION OF THE INSTITUTE

VISION

To evolve as a Centre of Excellence in Teaching, Innovative Research, Entrepreneurship and consultation in engineering and technology and empower the rural youth as globally competitive and self-disciplined technocrats.

MISSION

IM1: Inculcate technical knowledge, and soft skills through student centric teaching-learning process.

IM2: Strengthen industry institute interaction to provide solutions to the ever-changing requirements.

IM3: Create a work culture that encourage learning, Research & development.

IM4: Develop a unique practice that instills responsibility and accountability in association with stakeholders.

VISION & MISSION OF THE DEPARTMENT

VISION

To be recognized Centre of Excellence for providing high-quality Civil Engineering education.

MISSION

DM1: To provide time-trusted technical education to serve industry needs**.**

DM2: To provide state-of-the-art infrastructure and encourage logical thinking to face challenges.

DM3: To organize trainings and development workshops with emphasis on structural engineering.

DM4: To Involve in activities for the overall development of stakeholders with collaborations

PROGRAM EDUCATIONAL OBJECTIVES (PEOs)

Graduates of the Program will

PEO 1	Apply fundamentals for successful profession and/or for higher education in civil engineering
PEO 2	Use modern engineering tools for planning, design, execution and maintenance of works with sustainable development in the chosen profession.
PEO 3	Display communication skills and leadership quality needed to deal with industry and society.

PROGRAM OUTCOMES (POs)

After successful completion of the program, the graduates will be able to

PO1	Apply knowledge of mathematics, science, engineering fundamentals and an engineering specialization to the solution of complex engineering problems.
PO2	Identify, formulate, research literature and analyze complex engineering problems, reaching substantiated conclusions using first principles of mathematics, natural sciences and engineering sciences.
PO3	Design solutions for complex engineering problems and design systems, components or processes that meet specified needs with appropriate consideration for public health and safety, cultural, societal, and environmental considerations.
PO4	Conduct investigations of complex problems using research-based knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis of information to provide valid conclusions.
PO5	Create, select and apply appropriate techniques, resources, and modern engineering and IT tools, including prediction and modelling, to complex engineering activities, with an understanding of the limitations.
PO6	Apply reasoning informed by contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to professional engineering practice.
PO7	Understand the impact of professional engineering solutions in societal and environmental contexts and demonstrate knowledge of, and need for sustainable development.
PO8	Apply ethical principles and commit to professional ethics and responsibilities and norms of engineering practice.
PO9	Function effectively as an individual, and as a member or leader in diverse teams and in multidisciplinary settings.
PO10	Communicate effectively on complex engineering activities with the engineering community and with society at large, such as being able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions.
PO11	Demonstrate knowledge and understanding of engineering management principles and apply these to one's own work, as a member and leader in a team and to manage projects in multidisciplinary environments.
PO12	Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change.

PROGRAM SPECIFIC OUTCOMES (PSOs)

After successful completion of the program, the graduates will be able to

PSO 1	Design and execute of quality construction works
PSO 2	Use STAAD.Pro and ETABS for analyzing structures

Mission of the department – PEOs mapping

PEOs Statements		M1	M2	M3	M4
PEO1	Apply fundamentals for successful profession and/or for higher education in civil engineering.	3	3	2	2
PEO2	Use modern engineering tools for planning, design, execution and maintenance of works with sustainable development in the chosen profession..	2	3	3	2
PEO3	Exhibit professionalism, ethical attitude, communication and managerial skills, team work, social responsibility and adapt to current trends.	2	3	2	3

Note:.

Bloom's Taxonomy Knowledge Level	Knowledge Level Representation
Remember	K1
Understand	K2
Apply	K3
Analyse	K4
Evaluate	K5

Mapping / Correlation levels
1: Slight (Low)
2: Moderate (Medium)
3: Substantial (High)

(Effective for the students admitted into I year from the Academic Year **2024-25** onwards)

DNR College of Engineering & Technology 2024 Regulations (DR24 Regulations) applicable to all programmes given hereunder. These regulations govern the B. Tech. programmes offered by all the Departments with effect from the students admitted into the programmes from academic year 2024-25.

1. Courses of Study

The following programmes of study are offered at present as specializations for the B. Tech. programmes in DNR College of Engineering & Technology, Bhimavaram.

S.No.	Programme	Code	Short Name
1	Civil Engineering	01	CE
2	Electrical & Electronics Engineering	02	EEE
3	Mechanical Engineering	03	ME
4	Electronics & Communication Engineering	04	ECE
5	Computer Science & Engineering	05	CSE
6	Information Technology	12	IT
7	Artificial Intelligence and Data Science	54	AI & DS
8	Artificial Intelligence and Machine Learning	42	CSE(AIML)

2. Award of the Degree

a. Award of the B.Tech. Degree / B.Tech. Degree with a Minor if he/she fulfills the following:

i. Pursues a Programme of study for not less than four academic years and not more than eight academic years. However, for the students availing Gap year facility this period shall be extended by two years at the most and these two years would in addition to the maximum period permitted for graduation (Eight years).
ii. Registers for 160 credits and secures all 160 credits.

b. Award of B.Tech. degree with Honors: A student will be declared eligible for the award of the B.Tech with Honors if he/she fulfills the following:

i. Student secures additional 15 credits fulfilling all the requisites of a B.Tech. program i.e., 160 credits.
ii. Registering for Honors is optional.
iii. Honors is to be completed simultaneously with B.Tech. programme.

3. Students, who fail to fulfill all the academic requirements for the award of the degree within eight
academic years from the year of their admission, shall forfeit their seat in B.Tech. course and their admission stands cancelled. This clause shall be read along with clause 2 a) i).

4. Admissions

Admission to the B. Tech Program shall be made subject to the eligibility, qualifications and specialization prescribed by the A.P. State Government/JNTUK University from time to time. Admissions shall be made either based on the merit rank obtained by the student in the common entrance examination conducted by the A.P. Government/University or any other order of merit approved by the A.P. Government/University, subject to reservations as prescribed by the Government/University from time to time.

5. Program related terms

Credit: A unit by which the course work is measured. It determines the number of hours of instruction required per week. One credit is equivalent to one hour of teaching

(Lecture/Tutorial) or two hours of practical work/field work per week.

Credit Definition:

1 Hr. Lecture (L) per week	1 credit
1 Hr. Tutorial (T) per week	1 credit
1 Hr. Practical (P) per week	0.5 credit
2 Hrs. Practical (Lab) per week	1 credit

a. ***Academic Year:*** Two consecutive (one odd + one even) semesters constitute one academic year.

b. ***Choice-Based Credit System (CBCS):*** The CBCS provides a choice for students to select from the prescribed courses.

6. Semester/Credits:

a. A semester comprises 90 working days and an academic year is divided into two semesters.

b. The summer term is for eight weeks during summer vacation. Internship/ apprenticeship / work-based vocational education and training can be carried out during the summer term, especially by students who wish to exit after two semesters or four semesters of study.

c. Regular courses may also be offered during the summer on a fast-track mode to enable students to do additional courses or complete backlogs in a course work.

d. The college can decide on the courses to be offered in the summer term depending on the availability of the faculty and the number of students.

7. Structure of the Undergraduate Programme

All courses offered for the undergraduate program (B. Tech.) are broadly classified as follows:

S.No.	Category	Breakup of Credits (Total 160)	Percentage of total credits	AICTE Recommendation(%)
1.	Humanities and Social Science including Management (HM)	13	8 %	8 – 9%
2.	Basic Sciences (BS)	20	13 %	12 - 16%
3.	Engineering Sciences (ES)	23.5	14%	10 – 18%
4.	Professional Core (PC)	54.5	34 %	30 – 36%
5.	Electives – Professional (PE) & Open (OE); Domain Specific Skill Enhancement Courses (SEC)	33	21 %	19 - 23%
6.	Internships & Project work (PR)	16	10 %	8 – 11%
7.	Mandatory Courses (MC)	Non-credit	Non-credit	-

8. Course Classification:

All subjects/ courses offered for the undergraduate programme in Engineering & Technology (B.Tech. degree programmes) are broadly classified as follows:

S.No	Broad Course Classification	Course Category	Description
1.	Foundation Core Courses	Foundation courses	Includes Mathematics, Physics and Chemistry; fundamental engineering courses; humanities, social sciences and management courses
2.	Core Courses	Professional Core Courses (PC)	Includes courses related to the parent discipline/department/branch of Engineering
3.	Elective Courses	Professional Elective Courses (PE)	Includes elective courses related to the parent discipline/ department/ branch of Engineering
		Open Elective Courses (OE)	Elective courses which include interdisciplinary subjects or subjects in an area outside the parent discipline/ department/ branch of Engineering
		Domain specific skill enhancement courses (SEC)	Interdisciplinary/job-oriented/domain courses which are relevant to the industry
4.	Project & Internships	Project	B.Tech. Project or Major Project
		Internships	Summer Internships – Community based and Industry Internships; Industry oriented Full Semester Internship
5.	Audit Courses	Mandatory non-credit courses	Covering courses of developing desired attitude among the learners

9. Programme Pattern

i. Total duration of the of B. Tech (Regular) Programme is four academic years.
ii. Each academic year of study is divided into two semesters.
iii. Minimum number of instruction days in each semester is 90 days.

iv. There shall be mandatory student induction program for freshers, with a three- week duration before the commencement of first semester. Physical activity, Creative Arts, Universal Human Values, Literary, Proficiency Modules, Lectures by Eminent People, Visits to local Areas, Familiarization to Dept./Branch & Innovations etc., are included as per the guidelines issued by AICTE.

v. Health/wellness/yoga/sports and NSS /NCC /Scouts & Guides / Community service activities are made mandatory as credit courses for all the undergraduate students.

vi. Courses like Environmental Sciences, Indian Constitution, Technical Paper Writing & IPR are offered as non-credit mandatory courses for all the undergraduate students.

vii. Design Thinking for Innovation & Tinkering Labs are made mandatory as credit courses for all the undergraduate students.

viii. Increased flexibility for students through an increase in the elective component of the curriculum, with 05 Professional Elective courses and 04 Open Elective courses.

ix. Professional Elective Courses, include the elective courses relevant to the chosen specialization/branch. Proper choice of professional elective courses can lead to students specializing in emerging areas within the chosen field of study.

x. A total of 04 Open Electives are offered in the curriculum. A student can complete the requirement for B.Tech. Degree with a Minor within the 160 credits by opting for the courses offered through various verticals/tracks under Open Electives.

xi. While choosing the electives, students shall ensure that they do not opt for the courses with syllabus contents similar to courses already pursued.

xii. A pool of interdisciplinary/job-oriented/domain skill courses which are relevant to the industry are integrated into the curriculum of all disciplines. There shall be 05 skill-oriented courses offered during III to VII semesters. Among the five skill courses, four courses shall focus on the basic and advanced skills related to the domain/interdisciplinary courses and the other shall be a soft skills course.

xiii. Students shall undergo mandatory summer internships, for a minimum of eight weeks duration at the end of second and third year of the programme. The internship at the end of second year shall be community oriented and industry internship at the end of third year.

xiv. There shall also be mandatory full internship in the final semester of the programme along with the project work.

xv. Undergraduate degree with Honors is introduced by the College for the students having good academic record.

xvi. The College shall take measures to implement Virtual Labs (https://www.vlab.co.in) which provide remote access to labs in various disciplines of Engineering and will help student in learning basic and advanced concept through remote experimentation. Student shall be made to work on virtual lab experiments during the regular labs.

xvii. Each Department shall assign a faculty advisor/mentor after admission to a group of students from same department to provide guidance in courses registration/career growth/placements/opportunities for higher studies/GATE/other competitive exams etc.

xviii. Preferably 25% of course work for the theory courses in every semester shall be conducted in the blended mode of learning.

10. Evaluation Process

The performance of a student in each semester shall be evaluated course wise with a maximum of 100 marks for theory and 100 marks for practical subject. Summer Internships shall be evaluated for 50 marks, Full Internship & Project work in final semester shall be evaluated for 200 marks, mandatory courses with no credits shall be evaluated internally for 30 marks.

A student has to secure not less than 35% of marks in the end examination and a minimum of 40% of marks in the sum total of the internal evaluation and semester end examination marks taken together for the theory, practical, design, drawing subject or project etc. In case of a mandatory course, he/she should secure 40% of the total marks.

Theory Courses:

Assessment Method	Marks
Continuous Internal Assessment	30
Semester End Examination	70
Total	**100**

I. For theory and practical courses, the distribution shall be 30 marks for continuous Internal Evaluation and 70 marks for the Semester End-Examination.

II. If any course contains two different branch subjects, the syllabus shall be written in two parts with 3 units each (Part-A and Part-B) and semester end examination question paper shall be set with two parts each for 35 marks.

III. If any course is having both theory and practical components, they will be evaluated separately as theory course and practical course. However, they will be given same course code with an extension of 'T' for theory subject and 'P' for practical subject.

a) Continuous Internal Evaluation

I. For theory courses, during the semester, there shall be two internal examinations. Each internal examination shall be evaluated for 30 marks of which 10 marks for objective paper (20 minutes duration), 15 marks for subjective paper (90 minutes duration) and 5 marks for assignment.

II. Objective paper shall contain for 05 short answer questions with 2 marks each or maximum of 20 bits for 10 marks. Subjective paper shall contain 3 either or type questions (totally six questions from 1 to 6) of which student has to answer one from each either-or type of questions. Each question carries 5 marks.

i. Note:

- The objective paper shall be prepared in line with the quality of competitive examinations questions.
- The subjective paper shall contain 3 either or type questions of equal weightage of 5 marks. Any fraction shall be rounded off to the next higher mark.
- The objective paper shall be conducted on the day of subjective paper test.
- Assignments shall be in the form of problems, mini projects, design problems, slip tests, quizzes etc., depending on the course content. It should be continuous assessment throughout the semester and the average marks shall be considered.

i. If the student is absent for the internal examination, no re-exam shall be conducted and internal marks for that examination shall be considered as zero.

ii. The first internal examination shall be conducted for I, II and half of the III unit syllabus with one either or type question from each unit. The second internal examination shall be conducted for remaining half of the syllabus from III unit, IV and V units with one either or type question from each unit

i. Final internal marks shall be arrived at by considering the marks secured by the student in both the internal examinations with 80% weightage given to the better mid exam and 20% to the other.

For Example:
Marks obtained in first internal : 25
Marks obtained in second internal : 20
Final internal Marks: (25x0.8) + (20x0.2) = 24

If the student is absent for any one internal examination, the final internal marks shall be arrived at by considering 80% weightage to the marks secured by the student in the appeared examination and zero to the other. For Example:

Marks obtained in first internal : Absent
Marks obtained in second internal: 25
Final internal Marks: (25x0.8) + (0x0.2) =20

a) End Examination Evaluation:
End examination of theory courses shall have the following pattern:
i. Part-A shall contain 10 compulsory short answer questions for a total of 20marks such that each question carries 2 marks.

ii. There shall be 2 short answer questions from each unit.

iii. In each of the questions in Part-B, there shall be either/or type questions of 10 marks each. Student shall answer any one of them.

iv. The questions from 2 to 11 in part-B shall be set by covering one unit of the syllabus for each question either/or type.

End examination of theory courses consisting of two parts of different courses, ***for Example:*** Basic Electrical & Electronics Engineering shall have the following pattern:
i. Question paper shall be in two parts viz., Part A and Part B with equal weightage of 35 marks each.

ii. Part-A shall contain 10 compulsory short answer questions for a total of 10 marks such that each question carries 1mark.

iii. Part-B contains Six either/or type questions of 10 marks each. Students shall answer any one of them.

iv. All the questions in Part-B shall be set by covering one unit of the syllabus for each question.

Practical Courses:

Assessment Method	Marks
Continuous Internal Assessment	30
Semester End Examination	70
Total	**100**

a) For practical courses, there shall be a continuous evaluation during the semester for 30 sessional marks and end examination shall be for 70 marks.

b) Day-to-day work in the laboratory shall be evaluated for 15 marks by the concerned laboratory teacher based on the record/viva and 15 marks for the internal test.

c) The end examination shall be evaluated for 70 marks, conducted by the concerned laboratory teacher and a senior expert in the subject from the same department.

- Procedure: 20 marks
- Experimental work & Results: 30 marks
- Viva voce: 20 marks.

In a practical course consisting of two parts (Eg: Basic Electrical &Electronics Engineering Lab), the end examination shall be conducted for 70 marks as a single laboratory in 3 hours. Internal examination shall be evaluated for 30 marks in each part and final internal marks shall be arrived by considering the average of marks obtained in two parts.

d) For the course having design and/or drawing, such as Engineering Drawing/Graphics, the distribution of marks shall be 30 for continuous evaluation and 70 for semester end examination.

Assessment Method	Marks
Continuous Internal Assessment	30
Semester End Examination	70
Total	**100**

Day-to-day work shall be evaluated for 15 marks by the concerned subject teacher based on the reports/submissions prepared in the class. And there shall be two internal examinations in a semester for duration of 2 hours each for 15 marks with weightage of 80% to better internal exam marks and 20% for the other. The subjective paper shall contain 3 either or type questions of equal weightage of 5 marks. There shall be no objective paper in internal examination. The sum of day-to-day evaluation and the internal exam marks will be the final internal marks for the course.

The end examination pattern for Engineering Drawing/Graphics, shall consists of 5 questions, either/or type, of 14 marks each. There shall be no objective type questions in the end examination. However, the end examination pattern for other courses related to design/drawing , multiple branches, etc is mentioned along with the syllabus.

e) There shall be no external examination for mandatory courses with zero credits. However, attendance shall be considered while calculating aggregate attendance and student shall be declared to have passed the mandatory course only when he/she secures 40% or more in the internal examinations.

In case, the student fails, a re-examination shall be conducted for failed candidates for 30 marks satisfying the conditions mentioned in item 1 & 2 of the regulations.

f) The laboratory records and internal exam test papers shall be preserved for a minimum of 3 years in the respective Departments as per the College/University norms and shall be produced to the Committees of the College/University as and when the same are asked for.

11. Skill oriented Courses

i) There shall be five skill-oriented courses offered during III to VII semesters.

ii) Out of the five skill courses two shall be skill-oriented courses from the same domain of the remaining three skill courses, one shall be a soft skill course and the remaining two shall be skill-advanced courses from the same domain/Interdisciplinary/Job oriented.

iii) The course shall carry 100 marks and shall be evaluated through continuous assessments during the semester for 30 internal marks and end examination shall be for 70 marks. Day-to-day work in the class / laboratory shall be evaluated for 30 marks by the concerned teacher based on the regularity/assignments/viva/mid semester test. The end examination similar to practical examination pattern shall be conducted by the concerned teacher and an expert in the subject nominated by the Controller of Examinations/Principal.

iv) The Head of the Department shall identify a faculty member as coordinator for the course. A committee consisting of the Head of the Department, coordinator and a senior Faculty member nominated by the Head of the Department shall monitor the evaluation process. The marks/grades shall be assigned to the students by the above committee based on their performance.

v) The student shall be given an option to choose either the skill courses being offered by the college or to choose a certificate course being offered by industries/Professional bodies or any other accredited bodies. If a student chooses to take a Certificate Course offered by external agencies, the credits shall be awarded to the student upon producing the Course Completion Certificate from the agency. A committee shall be formed at the level of the Department/ College to evaluate the grades/marks given for a course by external agencies and convert to the equivalent marks/grades.

vi) The recommended courses offered by external agencies, conversions and appropriate grades/marks are to be approved by the College at the beginning of the semester.

vii) If a student prefers to take a certificate course offered by external agency, the concerned department shall mark attendance of the student for the remaining courses in that semester excluding the skill course in all the calculations of mandatory attendance requirements upon producing a valid certificate as approved by the College.

12. Massive Open Online Courses (MOOCs):

A Student has to pursue and complete one course compulsorily through MOOCs approved by the Institution. A student can pursue courses other than core through MOOCs and it is mandatory to complete one course successfully through MOOCs for awarding the degree. A student is not permitted to register and pursue core courses through MOOCs.

A student shall register for the course (Minimum of either 8 weeks or 12 weeks) offered through MOOCs with the approval of Head of the Department. The Head of the Department shall

appoint one mentor to monitor the student's progression. The student needs to earn a certificate by passing the exam. The student shall be awarded the credits assigned in the curriculum only by submission of the certificate. Examination fee, if any, will be borne by the student.

Students who have qualified in the proctored examinations conducted through MOOCs platform can apply for credit transfer as specified and are exempted from appearing internal as well as external examination (for the specified equivalent credit course only) conducted by the university. Necessary amendments in rules and regulations regarding adoption of MOOC courses would be proposed from time to time.

13. Credit Transfer Policy

Adoption of MOOCs is mandatory, to enable Blended model of teaching-learning as also envisaged in the NEP 2020. As per University Grants Commission (Credit Framework for Online Learning Courses through SWAYAM) Regulation, 2016, the Institution shall allow up to a maximum of 20% of the total courses being offered in a particular programme i.e., maximum of 32 credits through MOOCs platform.

i) The College shall offer credit mobility for MOOCs and give the equivalent credit weightage to the students for the credits earned through online learning courses.
ii) Student registration for the MOOCs shall be only through the respective department of the institution, it is mandatory for the student to share necessary information with the department.
iii) Credit transfer policy will be applicable to the Professional & Open Elective courses only.
iv) The concerned department shall identify the courses permitted for credit transfer.
v) The Institution/Department shall notify at the beginning of semester the list of the online learning courses eligible for credit transfer.
vi) The institution/Department shall designate a faculty member as a Mentor for each course to guide the students from registration till completion of the credit course.
vii) The Institution shall ensure no overlap of MOOC exams with that of the semester end examinations. In case of delay in results, the university will re-issue the marks sheet for such students.
viii) Student pursuing courses under MOOCs shall acquire the required credits only after successful completion of the course and submitting a certificate issued by the competent authority along with the percentage of marks and grades.
ix) The concerned Departments shall submit the following to the examination section of the Institution:

a) List of students who have passed MOOC courses in the current semester along with the certificate of completion.

b) Undertaking form filled by the students for credit transfer.

c) The Institution shall resolve any issues that may arise in the implementation of this policy from time to time and shall review its credit transfer policy in the light of periodic changes brought by UGC, SWAYAM, NPTEL and state government.

Note: Students shall be permitted to register for MOOCs offered through online platforms approved by the Department/Institution from time to time.

14. Academic Bank of Credits (ABC)

The Institution has implemented Academic Bank of Credits (ABC) to promote flexibility in curriculum as per NEP 2020 to

i) provide option of mobility for learners across the universities of their choice
ii) provide option to gain the credits through MOOCs from approved digital platforms.
iii) facilitate award of certificate/diploma/degree in line with the accumulated credits in ABC
iv) execute Multiple Entry and Exit system with credit count, credit transfer and credit acceptance from students' account.

15. Mandatory Internships

Summer Internships : Two summer internships either onsite or virtual each with a minimum of 08 weeks duration, done at the end of second and third years, respectively are mandatory. It shall be completed in collaboration with local industries, Govt. Organizations, construction agencies, Power projects, software MNCs or any industries in the areas of concerned specialization of the Undergraduate program. One of the two summer internships at the end of second year (Community Service Project) shall be society oriented and shall be completed in collaboration with government organizations/NGOs & others. The other internship at the end of third year is Industry Internship and shall be completed in collaboration with Industries. The student shall register for the internship as per course structure after commencement of academic year. The guidelines issued by the APSCHE / Institution shall be followed for carrying out and evaluation of Community Service Project and Industry Internship.

Evaluation of the summer internships shall be through the departmental committee. A student will be required to submit a summer internship report to the concerned department and appear for an oral presentation before the departmental committee comprising of Head of the Department, supervisor of the internship and a senior faculty member of the department. A certificate of successful completion from industry shall be included in the report. The report and the oral presentation shall carry 50% weightage each. It shall be evaluated for 50 external marks. There shall be no internal marks for Summer Internship. A student shall secure minimum 40% of marks for successful completion. In case, if a student fails, he/she shall reappear as and when semester supplementary examinations are conducted by the Institution.

Full Semester Internship and Project work: In the final semester, the student should mandatorily register and undergo internship (onsite/virtual) and in parallel he/she should work on a project with well-defined objectives. At the end of the semester the candidate shall submit an internship completion certificate and a project report. A student shall also be permitted to submit project report on the work carried out during the internship.

The project report shall be evaluated with an external examiner. The total marks for project work 200 marks and distribution shall be 60 marks for internal and 140 marks for external evaluation. The supervisor assesses the student for 30 marks (Report: 15 marks, Seminar: 15 marks). At the end of the semester, all projects shall be showcased at the department for the benefit of all students and staff and the same is to be evaluated by the departmental Project Review Committee consisting of supervisor, a senior faculty and HOD for 30 marks. The external evaluation of Project Work is a Viva-Voce Examination conducted in the presence of internal examiner and external examiner appointed by the Institution and is evaluated for 140 marks.

The concerned Department shall facilitate and monitor the student internship programs. Completion of internships is mandatory, if any student fails to complete internship, he/she will not be eligible for the award of degree. In such cases, the student shall repeat and complete the internship.

16. Guidelines for offering a Minor

To promote interdisciplinary knowledge among the students, the students admitted into B.Tech. in a major stream/branch are eligible to obtain degree in Minor in another stream.

i) The Minor program requires the completion of 12 credits in Minor stream chosen.
ii) Two courses for 06 credits related to a Minor are to be pursued compulsorily for the minor degree, but maybe waived for students who have done similar/equivalent courses. If waived for a student, then the student must take an extra elective course in its place. It is recommended that students should complete the compulsory courses (or equivalents) before registering for the electives.
iii) Electives (minimum of 2 courses) to complete a total of 12 credits.

Note: A total of 04 Open Electives are offered in the curriculum. A student can complete the requirement for Minor by opting for the courses offered through various verticals/tracks under Open Electives.

17. Guidelines for offering Honors

The objective of introducing B.Tech. (Hons.) is to facilitate the students to choose additionally the specialized courses of their choice and build their competence in a specialized area in the UG level. The programme is a best choice for academically excellent students having good academic record and interest towards higher studies and research.

i) Honors is introduced in the curriculum of all B. Tech. programs offering a major degree and is applicable to all B. Tech (Regular and Lateral Entry) students admitted in Engineering & Technology.
ii) A student shall earn additional 15 credits for award of B.Tech.(Honors) degree from same branch/department/discipline registered for major degree. This is in addition to the credits essential for obtaining the Undergraduate degree in Major Discipline (i.e., 160 credits).
iii) A student is permitted to register for Honors in IV semester after the results of III Semester are declared and students may be allowed to take maximum two subjects per semester pertaining to the Honors from V Semester onwards.
iv) The concerned HOD shall arrange separate class work and timetable of the courses offered under Honors program.
v) Courses that are used to fulfil the student's primary major may not be double counted towards the Honors. Courses with content substantially equivalent to courses in the student's primary Major may not be counted towards the Honors.
vi) Students can complete the courses offered under Honors either in the college or in online platforms like SWAYAM with a minimum duration of 12 weeks for a 3-credit course and
vii) 8 weeks duration for a 2-credit course satisfying the criteria for credit mobility. If the courses under Honors are offered in conventional mode, then the teaching and evaluation procedure shall be similar to regular B. Tech courses.
viii) The attendance for the registered courses under Honors and regular courses offered for Major degree in a semester are to be considered separately.

ix) A student shall maintain an attendance of 75% in all registered courses under Honors to be eligible for attending semester end examinations.
x) **A student registered for Honors shall pass in all subjects that constitute the requirement for the Honors** degree program**.** No class/division (i.e., second class, first class and distinction, etc.) shall be awarded for Honors degree programme.
xi) If a student drops or is terminated from the Honors program, the additional credits so far

earned cannot be converted into open or core electives; they will remain extra. However, such students will receive a separate grade sheet mentioning the additional courses completed by them.
xii) The Honors will be mentioned in the degree certificate as Bachelor of Technology (Honors) in XYZ. For example, B.Tech. (Honors) in Mechanical Engineering

Enrolment into Honors:

i) Students of a Department/Discipline are eligible to opt for Honors program offered by the same Department/Discipline
ii) The enrolment of student into Honors is based on the CGPA obtained in the major degree program. CGPA shall be taken up to III semester in case of regular entry students and only III semester in case of lateral entry students. Students having 7 CGPA without any backlog subjects will be permitted to register for Honors.
iii) If a student is detained due to lack of attendance either in Major or in Honors, registration shall be cancelled.
iv) Transfer of credits from Honors to regular B. Tech degree and vice-versa shall not be permitted.
v) Honors is to be completed simultaneously with a Major degree program.

Registration for Honors:

i) The eligible and interested students shall apply through the HOD of his/her parent department. The whole process should be completed within one week before the start of every semester. Selected students shall be permitted to register the courses under Honors.
ii) The selected students shall submit their willingness to the principal through his/her parent department offering Honors. The parent department shall maintain the record of student pursuing the Honors.
iii) The students enrolled in the Honors courses will be monitored continuously. An advisor/mentor from parent department shall be assigned to a group of students to monitor the progress.
iv) There is no fee for registration of subjects for Honors program offered in offline at the respective institutions.

18. Attendance Requirements

i) A student shall be eligible to appear for the external examinations if he/she acquires a minimum of 40% attendance in each subject and 75% of attendance in aggregate of all the
ii) subjects. Condonation of shortage of attendance in aggregate up to 10% (65% and above and below 75%) in each semester may be granted by the College Academic Committee.
iii) Shortage of Attendance below 65% in aggregate shall in NO CASE be condoned.

iv) A stipulated fee shall be payable towards condonation of shortage of attendance to the College.
v) Students whose shortage of attendance is not condoned in any semester are not eligible to take their end examination of that class and their registration shall stand cancelled.
vi) A student will not be promoted to the next semester unless he satisfies the attendance requirements of the present semester. They may seek readmission for that semester from the date of commencement of class work.
vii) If any candidate fulfils the attendance requirement in the present semester, he shall not be eligible for readmission into the same class.
viii) If the learning is carried out in blended mode (both offline & online), then the total attendance of the student shall be calculated considering the offline and online attendance of the student.
ix) For induction programme attendance shall be maintained as per AICTE norms.

19. Promotion Rules

The following academic requirements must be satisfied in addition to the attendance requirements mentioned in section 16.

i) A student shall be promoted from first year to second year if he/she fulfils the minimum attendance requirement as per institution norms.
ii) A student will be promoted from II to III year if he/she fulfils the academic requirement of securing 40% of the credits (any ***decimal*** fraction should be ***rounded off*** to ***lower*** digit) up to in the subjects that have been studied up to III semester.
iii) A student shall be promoted from III year to IV year if he/she fulfils the academic requirements of securing 40% of the credits (any ***decimal*** fraction should be ***rounded off*** to ***lower*** digit) in the subjects that have been studied up to V semester.
And in case a student is detained for want of credits for a particular academic year by ii) & iii) above, the student may make up the credits through supplementary examinations and only after securing the required credits he/she shall be permitted to join in the V semester or VII semester respectively as the case may be.
iv) When a student is detained due to lack of credits/shortage of attendance he/she may be re-admitted when the semester is offered after fulfilment of academic regulations. In such case, he/she shall be in the academic regulations into which he/she is readmitted.

20. Grading

As a measure of the student's performance, a 10-point Absolute Grading System using the following Letter Grades and corresponding percentage of marks shall be followed:
After each course is evaluated for 100 marks, the marks obtained in each course will be converted to a corresponding letter grade as given below, depending on the range in which the marks obtained by the student fall.

Structure of Grading of Academic Performance

Range in which the marks in the subject fall	Grade	Grade points Assigned
90 & above	S (Superior)	10
80 - 89	A (Excellent)	9
70 - 79	B (Very Good)	8
60 - 69	C (Good)	7
50 - 59	D (Average)	6
40 - 49	E (Pass)	5
< 40	F (Fail)	0
Absent	Ab (Absent)	0

i) A student obtaining Grade 'F' or Grade 'Ab' in a subject shall be considered failed and will be required to reappear for that subject when it is offered the next supplementary examination.
ii) For non-credit audit courses, "Satisfactory" or "Unsatisfactory" shall be indicated instead of the letter grade and this will not be counted for the computation of SGPA/CGPA/Percentage.

Computation of Semester Grade Point Average (SGPA) and Cumulative GradePoint Average (CGPA): The Semester Grade Point Average (SGPA) is the ratio of sum of the product of the number of credits with the grade points scored by a student in all the courses taken by a student and the sum of the number of credits of all the courses undergone by a student, i.e.,

$$SGPA = \Sigma (Ci \times Gi)/\Sigma Ci$$

where, Ci is the number of credits of the ith subject and Gi is the grade point scored by the student in the ith course.

The Cumulative Grade Point Average (CGPA) will be computed in the same manner considering all the courses undergone by a student over all the semesters of a program, i.e.,

$$CGPA = \Sigma (Ci \times Si)/ \Sigma Ci$$

where "Si" is the SGPA of the ith semester and Ci is the total numberof credits up to that semester.

Both SGPA and CGPA shall be rounded off to 2 decimal points and reported in the transcripts.

While computing the SGPA the subjects in which the student is awarded Zero grade points will also be included.

Grade Point: It is a numerical weight allotted to each letter grade on a 10-point scale.

Letter Grade: It is an index of the performance of students in a said course. Grades are denoted by the letters S, A, B, C, D and F.

Award of Class:

After a student has satisfied the requirements prescribed for the completion of the program and is eligible for the award of B. Tech. Degree, he/she shall be placed in one of the following four classes:

Class Awarded	CGPA Secured
First Class with Distinction	≥ 7.5
First Class	≥ 6.5 < 7.5
Second Class	≥ 5.5 < 6.5
Pass Class	≥ 5.0 < 5.5

CGPA to Percentage conversion Formula – (CGPA – 0.5) x 10

21. Withholding of Results

If the candidate has any dues not paid to the institution or if any case of indiscipline or malpractice is pending against him/her, the result of the candidate shall be withheld in such cases.

22. Multiple Entry / Exit Option

a. Exit Policy:

The students can choose to exit the four-year programme at the end of first/second/third year.

i) **UG Certificate in (Field of study/discipline)** - Programme duration: First year (first two semesters) of the undergraduate programme, 40 credits followed by an additional exit 10-credit bridge course(s) lasting two months, including at least 6- credit job-specific internship/ apprenticeship that would help the candidates acquire job-ready competencies required to enter the workforce.

ii) **UG Diploma (in Field of study/discipline)** - Programme duration: First two years (first four semesters) of the undergraduate programme, 80 credits followed by an additional exit 10-credit bridge course(s) lasting two months, including at least 6- credit job-specific internship/ apprenticeship that would help the candidates acquire job-ready competencies required to enter the workforce.

iii) **Bachelor of Science (in Field of study/discipline)** i.e., **B.Sc. Engineering in (Field of study/discipline)**- Programme duration: First three years (first six semesters) of the undergraduate programme, 120 credits.

b. Entry Policy:

Modalities on multiple entry by the student into the B.Tech. programme will be provided in due course of time.

Note: The Institution/University shall resolve any issues that may arise in the implementation of Multiple Entry and Exit policies from time to time and shall review the policies in the light of periodic changes brought by UGC, AICTE and State government.

23. Gap Year Concept

Gap year concept for Student Entrepreneur in Residence is introduced and outstanding students who wish to pursue entrepreneurship / become entrepreneur are allowed to take a break of one year at any time after II year to pursue full-time entrepreneurship programme/to establish startups. This period

may be extended to two years at the most and these two years would not be counted for the time for the maximum time for graduation. The principal of the respective college shall forward such proposals submitted by the students to the Institution . An evaluation committee constituted by the University shall evaluate the proposal submitted by the student and the committee shall decide whether to permit the student(s) to avail the Gap Year or not

24. Transitory Regulations

Discontinued, detained, or failed candidates are eligible for readmission as and when the semester is offered after fulfilment of academic regulations. Candidates who have been detained for want of attendance or not fulfilled academic requirements or who have failed after having undergone the course in earlier regulations or have discontinued and wish to continue the course are eligible for admission into the unfinished semester from the date of commencement of class work with the same or equivalent subjects as and when subjects are offered, subject to Section 2 and they will follow the academic regulations into which they are readmitted.

Candidates who are permitted to avail Gap Year shall be eligible for re-joining into the succeeding year of their B. Tech from the date of commencement of class work, subject to Section **2** and they will follow the academic regulations into which they are readmitted.

25. Minimum Instruction Days for a Semester:

The minimum instruction days including exams for each semester shall be 90 days.

26. Medium of Instruction:

The medium of instruction of the entire B. Tech undergraduate programme in Engineering &Technology (including examinations and project reports) will be in English only.

27. Student Transfers:

Student transfers shall be as per the guidelines issued by the Government of Andhra Pradesh and the University/Institution from time to time.

28. General Instructions:

I. The academic regulations should be read as a whole for purpose of any interpretation.

II. Malpractices rules-nature and punishments are appended.

III. Where the words “he”, “him”, “his”, occur in the regulations, they also include “she”, “her”, “hers”, respectively.

IV. In the case of any doubt or ambiguity in the interpretation of the above rules, the decision of the Principal is final.

V. The Institute may change or amend the academic regulations or syllabi at any time and the changes or amendments shall be made applicable to all the students on rolls with effect from the dates notified by the institute.

VI. In the case of any doubt or ambiguity in the interpretation of the guidelines given, the decision of the Head of the institution is final.

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ACADEMIC REGULATIONS (DR24) FOR B.TECH.

(LATERAL ENTRY SCHEME)

*(Effective for the students admitted into II year through Lateral Entry Scheme from the Academic Year **2025-26** onwards)*

1. **Award of the Degree**

   a. **Award of the B.Tech. Degree / B.Tech. Degree with a Minor** if he/she fulfils the following:
      i. Pursues a programme of study for not less than three academic years and not more than six academic years. However, for the students availing Gap year facility this period shall be extended by two years at the most and these two years would in addition to the maximum period permitted for graduation (Six years).
      ii. Registers for 120 credits and secures all 120 credits.

   b. **Award of B.Tech. degree with Honors** if he/she fulfils the following:
      i. Student secures additional 15 credits fulfilling all the requisites of a B.Tech. program i.e., 120 credits.
      ii. Registering for Honors is optional.
      iii. Honors is to be completed simultaneously with B.Tech. programme.

2. Students, who fail to fulfil the requirement for the award of the degree within six consecutive academic years from the year of admission, shall forfeit their seat.

3. **Minimum Academic Requirements**

   The following academic requirements have to be satisfied in addition to the requirements mentioned in item no.**2**
      i. A student shall be deemed to have satisfied the minimum academic requirements and earned the credits allotted to each theory, practical, design, drawing subject or project if he secures not less than 35% of marks in the end examination and a minimum of 40% of marks in the sum total of the internal evaluation and end examination taken together.
      ii. A student shall be promoted from III year to IV year if he/she fulfils the academic requirements of securing 40% of the credits (any decimal fraction should be rounded off to lower digit) in the subjects that have been studied up to V semester.
      iii. And in case if student is already detained for want of credits for particular academic year, the student may make up the credits through supplementary exams of the above exams before the commencement of IV year I semester class work of next year.

4. **Course Pattern**

      i. The entire course of study is three academic years on semester pattern.
      ii. A student eligible to appear for the end examination in a subject but absent at it or has failed in the end examination may appear for that subject at the next supplementary examination offered.
      iii. When a student is detained due to lack of credits/shortage of attendance the student may be re-admitted when the semester is offered after fulfilment of academic regulations, the student shall be in the academic regulations into which he/she is readmitted.

5. All other regulations as applicable for B. Tech. Four-year degree course (Regular) will hold good for B. Tech. (Lateral Entry Scheme).

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B.Tech. - COURSE STRUCTURE – DR24

(Applicable from the academic year 2024-25 onwards)

INDUCTION PROGRAMME

S.No.	Course Name	Category	L-T-P-C
1	Physical Activities -- Sports, Yoga and Meditation, Plantation	MC	0-0-6-0
2	Career Counselling	MC	2-0-2-0
3	Orientation to all branches -- career options, tools, etc.	MC	3-0-0-0
4	Orientation on admitted Branch -- corresponding labs, tools and platforms	EC	2-0-3-0
5	Proficiency Modules & Productivity Tools	ES	2-1-2-0
6	Assessment on basic aptitude and mathematical skills	MC	2-0-3-0
7	Remedial Training in Foundation Courses	MC	2-1-2-0
8	Human Values & Professional Ethics	MC	3-0-0-0
9	Communication Skills -- focus on Listening, Speaking, Reading, Writing skills	BS	2-1-2-0
10	Concepts of Programming	ES	2-0-2-0

Group-A Branches:

CSE (05), B. Tech-AIDS (54) & CSE- AIML(42)

Group-B Branches:

CE(01), EEE (02), ME (03), ECE (04), & IT(12)

DR24

ENGINEERING CURRICULUM

W.e.f. 2024-25

I YEAR – I SEMESTER

B.Tech. (Regular-Full time)

(Effective for the students admitted into I year from
The Academic Year **2024-25** onwards)

EPARTMENT OF BASIC SCIENCE AND HUMANITIES

B.Tech. I Year I Semester (for Group –A Branches - CSE, AID, CSM)

S.No.	Category	Subject Code	Title	L/D	T	P	Credits
1	BS&H	BT24BS1101	Communicative English	2	0	0	2
2	BS&H	BT24BS1102	Chemistry	3	0	0	3
3	BS&H	BT24BS1103	Linear Algebra & Calculus	3	0	0	3
4	Engineering Science	BT24CE1101	Basic Civil & Mechanical Engineering	3	0	0	3
5	Engineering Science	BT24CS1101	Introduction to Programming	3	0	0	3
6	BS&H	BT24BS1105	Communicative English Lab	0	0	2	1
7	BS&H	BT24BS1106	Chemistry Lab	0	0	2	1
8	Engineering Science	BT24ME1103	Engineering Workshop	0	0	3	1.5
9	Engineering Science	BT24CS1103	Computer Programming Lab	0	0	3	1.5
10	BS&H	BT24BS1108	Health and wellness, Yoga and Sports	-	-	1	0.5
Total				**14**	**0**	**11**	**19.5**

B.Tech. I Year I Semester (for Group – B Branches – (CE, EEE, ME, ECE & IT)

S.No	Category	Subject code	Title	L/D	T	P	Credits
1	BS&H	BT24BS1104	Engineering Physics	3	0	0	3
2	BS&H	BT24BS1103	Linear Algebra & Calculus	3	0	0	3
3	Engineering Science	BT24EE1101	Basic Electrical & Electronics Engineering	3	0	0	3
4	Engineering Science	BT24ME1101/ BT24ME1102	Engineering graphics/ Engineering drawing	1	0	4	3
5	Engineering Science	BT24CS1101	Introduction to Programming	3	0	0	3
6	Engineering Science	BT24CS1102	IT Workshop	0	0	2	1
7	BS& H	BT24BS1107	Engineering Physics Lab	0	0	2	1
8	Engineering Science	BT24EE1102	Electrical & Electronics Engineering Workshop	0	0	3	1.5
9	Engineering Science	BT24CS1103	Computer Programming Lab	0	0	3	1.5
10	BS&H	BT24BS1109	NSS/NCC/Scouts & Guides/ Community Service	-	-	1	0.5
Total				**13**	**0**	**15**	**20.5**

DEPARTMENT OF BASIC SCIENCE AND HUMANITIES

I Year- I Semester	Course Code: BT24BS1101	L	T	P	C
		2	0	0	2
COMMUNICATIVE ENGLISH *(Common to All Branches of Engineering)*					

Course Objectives:

The main objective of introducing this course, *Communicative English,* is to facilitate effective listening, Reading, Speaking and Writing skills among the students. It enhances the same in their comprehending abilities, oral presentations, reporting useful information and providing knowledge of grammatical structures and vocabulary. This course helps the students to make them effective in speaking and writing skills and to make them industry ready.

Course Outcomes:

CO1: Understand the context, theme, and pieces of specific information from social or Transactional dialogues.

CO2: Apply the principles of writing skills and cohesive devices in paragraphs and formal/informal communication.

CO3: Build confidence and creative thinking by challenging the hardships in life.

CO4: Discover the peace and amicable relations in human development.

CO5: Perceive the personal traits and communicative competence in the form of interpersonal communication.

CO6: Form error free sentences in communication by using proper grammatical structures and correct word forms.

CO/PO/PSO Mapping:

CO/ PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PS O1	PS O2
CO1	-	-	-	-	-	-	-	-	-	3	-	-	-	-
CO2	-	-	-	-	-	-	-	-	-	3	-	2	-	-
CO3	-	-	-	-	-	-	-	-	-	3	-	-	-	-
CO4	-	-	-	-	-	-	-	-	-	3	-	-	-	-
CO5	-	-	-	-	-	-	-	-	-	3	-	-	-	-
CO6	-	-	-	-	-	-	-	-	-	3	-	3	-	-

UNIT I **Lesson: HUMAN VALUES: Gift of Magi (Short Story)**

Listening: Identifying the topic, the context and specific pieces of information by listening to short audio texts and answering a series of questions.

Speaking: Asking and answering general questions on familiar topics such as home, family, work, studies and interests; introducing oneself and others.

Reading: Skimming to get the main idea of a text; scanning to look for specific pieces of information.

Writing: Mechanics of Writing-Capitalization, Spellings, Punctuation-Parts of Sentences.

Grammar: Parts of Speech, Basic Sentence Structures-forming questions

Vocabulary: Synonyms, Antonyms, Affixes (Prefixes/Suffixes), Root words.

UNIT II Lesson: NATURE: The Brook by Alfred Tennyson (Poem)

Listening: Answering a series of questions about main ideas and supporting ideas after listening to audio texts.

Speaking: Discussion in pairs / small groups on specific topics followed by short structure talks

Reading: Identifying sequence of ideas; recognizing verbal techniques that help to link the ideas in a paragraph together.

Writing: Structure of a paragraph - Paragraph writing (specific topics)

Grammar: Cohesive devices - linkers, use of articles and zero article; prepositions.

Vocabulary: Homonyms, Homophones, Homographs.

UNIT III Lesson: BIOGRAPHY: Elon Musk

Listening: Listening for global comprehension and summarizing what is listened to.

Speaking: Discussing specific topics in pairs or small groups and reporting what is discussed

Reading : Reading a text in detail by making basic inferences -recognizing and interpreting specific context clues; strategies to use text clues for comprehension.

Writing : Summarizing, Note-making, paraphrasing

Grammar: Verbs - tenses; subject-verb agreement; Compound words, Collocations

Vocabulary: Compound words, Collocations

UNIT IV Lesson: INSPIRATION: The Toys of Peace by Saki

Listening: Making predictions while listening to conversations/ transactional dialogues without video; listening with video.

Speaking: Role plays for practice of conversational English in academic contexts (formal and informal) - asking for and giving information/directions.

Reading: Studying the use of graphic elements in texts to convey information, reveal trends/patterns/relationships, communicate processes or display complicated data.

Writing: Letter Writing: Official Letters, Resumes

Grammar: Reporting verbs, Direct & Indirect speech, Active & Passive Voice

Vocabulary: Words often confused, Jargons

UNIT V Lesson: MOTIVATION: The Power of Intrapersonal Communication (An Essay)

Listening: Identifying key terms understanding concepts and answering a series of relevant questions that test comprehension.

Speaking: Formal oral presentations on topics from academic contexts

Reading: Reading comprehension.

Writing: Writing structured essays on specific topics.

Grammar: Editing short texts –identifying and correcting common errors in grammar and usage (articles, prepositions, tenses, subject verb agreement)

Vocabulary: Technical Jargons

Textbooks:

1. Pathfinder: Communicative English for Undergraduate Students, 1st Edition, Orient Black Swan, 2023 (Units 1,2 & 3)
2. Empowering with Language by Cengage Publications, 2023 (Units 4 & 5)

Reference Books:

3. Dubey, Sham Ji & Co. English for Engineers, Vikas Publishers, 2020
4. Bailey, Stephen. Academic writing: A Handbook for International Students, Routledge,2014.
5. Murphy, Raymond. English Grammar in Use, Fourth Edition, Cambridge University Press, 2019.

DEPARTMENT OF BASIC SCIENCE AND HUMANITIES

I Year- I Semester	Course Code: BT24BS1102	L	T	P	C
		3	0	0	3
CHEMISTRY *(Common to CSE, AIML, AIDS)*					

Course Objectives:

- To familiarize engineering chemistry and its applications
- To train the students on the principles and applications of electrochemistry and polymers

Course Outcomes:

At the end of the course, the students will be able to:

CO1: Understand the fundamentals of Quantum mechanics and Molecular Orbital Theory)

CO2: Apply the basic principles of semiconductors, super conductors, and nanomaterials in real world applications. .

CO3: Compare the materials for construction of batteries and electrochemical sensors.

CO4: Explain the preparation, properties, and applications of thermoplastics, thermosetting, elastomers and conducting polymers

CO5: Summarize the concepts of Instrumental methods.

CO6: Define the principles of spectrometry, slc in separation of solid and liquid mixtures.

CO/PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO 12	PS O1	PS O2
CO1	3	2	2	-	-	-	-	-	-	-	-	1	-	-
CO2	3	2	2	-	-	-	-	-	-	-	-	2	-	-
CO3	2	2	2	-	-	-	-	-	-	-	-	2	-	-
CO4	3	2	2	-	-	-	-	-	-	-	-	2	-	-
CO5	3	2	2	-	-	-	-	-	-	-	-	2	-	-
CO6	3	2	2	-	-	-	-	-	-	-	-	1	-	-

UNIT -I: Structure and Bonding Models **(10Hours)**

Fundamentals of Quantum mechanics, Schrodinger Wave equation, significance of Ψ and Ψ2, particle in one dimensional box, molecular orbital theory – bonding in homo- and heteronuclear diatomic molecules– energy level diagrams of O2 and CO, etc. π-molecular orbitals of butadiene and benzene, calculation of bond order.

UNIT -II: Modern Engineering materials **(10Hours)**

Semiconductors – Introduction, basic concept, application

Super conductors-Introduction basic concept, applications.

Super capacitors: Introduction, Basic Concept-Classification – Applications.

Nano materials: Introduction, classification, properties and applications of Fullerenes, carbon nano tubes and Graphene nanoparticles.

UNIT -III: Electrochemistry and Applications (10Hours)

Electrochemical cell, Nernst equation, cell potential calculations and numerical problems, potentiometer- potentiometric titrations (redox titrations), concept of conductivity, conductivity cell, conductometric titrations (acid-base titrations).

Primary cells – Zinc-air battery, Secondary cells –lithium-ion batteries- working of the batteries including cell reactions; Fuel cells, hydrogen-oxygen fuel cell– working of the cells. Polymer Electrolyte Membrane Fuel cells (PEMFC). Electrochemical sensors – potentiometric sensors with examples, amperometric sensors with examples

Electrochemical sensors – potentiometric sensors with examples, amperometric sensors with examples.

UNIT -IV: Polymer Chemistry (10Hours)

Introduction to polymers, functionality of monomers, chain growth and step growth polymerization, coordination polymerization, with specific examples and mechanisms of polymer formation.

Plastics –Thermo and Thermosetting plastics, Preparation, properties and applications of – PVC, Teflon, Bakelite, Nylon-6,6, carbon fibres.

Elastomers–Buna-S, Buna-N–preparation, properties and applications. Conducting polymers – polyacetylene, polyaniline, – mechanism of conduction and applications. Bio- Degradable polymers - Poly Glycolic Acid (PGA), Poly Lactic Acid (PLA).

UNIT -V: Instrumental Methods and Applications (10Hours)

Electromagnetic spectrum, Absorption of radiation: Beer-Lambert's law. UV-Visible Spectroscopy, electronic transition, Instrumentation, IR spectroscopes', fundamental modes and selection rules, Instrumentation. Chromatography-Basic Principle, Classification-HPLC: Principle, Instrumentation and Applications.

Textbooks:

1. Jain and Jain, Engineering Chemistry, 16/e, Dhanpat Rai, 2013.
2. Peter Atkins, Julio de Paula and James Keeler, Atkins' Physical Chemistry, 10/e, Oxford University Press, 2010.

Reference Books:

1. Skoog and West, Principles of Instrumental Analysis, 6/e, Thomson, 2007.
2. J. D. Lee, Concise Inorganic Chemistry, 5th Edition, Wiley Publications, Feb.2008
3. Text book of Polymer Science, Fred W. Billmayer Jr., 3rd Edition
4. A text book of Engineering Chemistry by Sashi Chawala, Dhanpat Rai & Co. 2017

DEPARTMENT OF BASIC SCIENCE AND HUMANITIES

I Year- I Semester	Course Code: BT24BS1103	L	T	P	C
		3	0	0	3
LINEAR ALGEBRA&CALCULUS *(Common to All Branches of Engineering)*					

Course Objectives:
To equip the students with standard concepts and tools at an intermediate to advanced level mathematics to develop the confidence and ability among the students to handle various real-world problems and their applications.

Course Outcomes: At the end of the course, the student will be able to
CO1: Describe the basic properties on elementary row and column operations
CO2: Solve a given system of linear algebraic equations.
CO3: Find the Characteristic equation, Eigen values & Eigen vectors.
CO4: Utilize mean value theorems to real life problems.
CO5: Apply the concept of the partial differentiation in various engineering fields.
CO6: Evaluate double, triple integrals and their applications.

CO/ PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PS O1	PS O2
CO1	1	3	-	-	-	-	-	-	-	-	-	-	-	-
CO2	1	3	-	-	-	-	-	-	-	-	-	-	-	-
CO3	1	3	-	-	-	-	-	-	-	-	-	-	-	-
CO4	1	3	-	-	-	-	-	-	-	-	-	-	-	-
CO5	2	3	-	-	-	-	-	-	-	-	-	-	-	-
CO6	2	3	-	-	-	-	-	-	-	-	-	-	-	-

UNIT-I Matrices **10 hr**
Rank of a matrix by echelon form, normal form. Cauchy– Binet formulae (without proof). Inverse of Non-singular matrices by Gauss-Jordan method, System of linear equations: Solving system of Homogeneous and Non-Homogeneous equations, Gauss elimination method, Jacobi and Gauss Seidel Iteration Methods.

UNIT-II Eigen values, Eigen vectors and Orthogonal Transformation **10 hr**
Eigen values, Eigen vectors and their properties, Diagonalization of a matrix, Cayley -Hamilton Theorem (without proof) ,finding inverse and power of a matrix by Cayley-Hamilton Theorem, Quadratic forms and Nature of the Quadratic Forms, Reduction of Quadratic form to canonical forms by Orthogonal Transformation.

UNIT-III Calculus **8 hr**
Mean Value Theorems: Rolle's Theorem, Lagrange's mean value theorem with their geometrical interpretation, Cauchy's mean value theorem, Taylor's and Maclaurin theorems with remainders (without proof), Problems and applications on the above theorems.

UNIT-IV Partial differentiation and Applications (Multivariable calculus) **10 hr**
Functions of several variables: Continuity and Differentiability, Partial derivatives, total derivatives, chain rule, Directional derivative, Taylor's and Maclaurin's series expansion of functions of two variables. Jacobians, Functional dependence, maxima and minima of functions of two variables, method of Lagrange multipliers.

UNIT-V Multiple Integrals (Multi variable Calculus) 10 hr

Double integrals, triple integrals, change of order of integration, change of variables to polar, cylindrical and spherical coordinates. Finding areas (by double integrals) and volumes (by double integrals and triple integrals).

Textbooks:

1. Higher Engineering Mathematics, B.S.Grewal, Khanna Publishers,2017, 44thEdition
2. Advanced Engineering Mathematics, Erwin Kreyszig, John Wiley & Sons, 2018, 10thEdition.

Reference Books:

1. Thomas Calculus, George B.Thomas, Maurice D.Weirand Joel Hass, Pearson Publishers, 2018, 14th Edition.
2. Advanced Engineering Mathematics, R.K.Jain and S.R.K.Iyengar, Alpha Science International Ltd., 20215th Edition(9th reprint).
3. Advanced Modern Engineering Mathematics, Glyn James, Pearson publishers, 2018, 5thEdition.
4. Advanced Engineering Mathematics, Micheael Greenberg,Pearson publishers, 9thedition
5. Higher Engineering Mathematics, H.KDas, Er.RajnishVerma, S.Chand Publications,2014, Third Edition (Reprint 2021)

DEPARTMENT OF CIVIL ENGINEERING & DEAPRTMENT OF MECHANICAL ENGINEERING

I Year- I Semester	Course Code: BT24CE1101	L	T	P	C
		3	0	0	3
BASIC CIVIL AND MECHANICAL ENGINEERING *(Common to All branches of Engineering)*					

Course Objectives:

- Get familiarized with the scope and importance of Civil Engineering sub-divisions.
- Introduce the preliminary concepts of surveying.
- Acquire preliminary knowledge on Transportation and its importance in nation's economy.
- Get familiarized with the importance of quality, conveyance and storage of water.
- Introduction to basic civil engineering materials and construction techniques.

Course Outcomes: On completion of the course, the student should be able to:
CO1: Understand the various sub divisions of Civil Engineering and their role in ensuring better society.
CO2: Know the objectives of surveying and understand the measurement of distances, angles and levels through surveying
CO3: Understand the role of Transportation Engineering in Nation's economy and importance of Water Resource Engineering and Environmental Engineering.

CO/ PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO 12	PS O1	PS O2
CO1	3	1	-	-	-	2	1	1	1	1	2	2	2	2
CO2	3	2	-	-	1	2	-	1	2	1	2	1	2	2
CO3	3	1	-	-	1	2	2	1	1	1	2	2	2	1

Part A: BASIC CIVIL ENGINEERING

UNIT I

Basics of Civil Engineering: Role of Civil Engineers in Society- Various Disciplines of Civil Engineering- Structural Engineering- Geo-technical Engineering- Transportation Engineering Hydraulics and Water Resources Engineering - Environmental Engineering-Scope of each discipline - Building Construction and Planning- Construction Materials-Cement - Aggregate - Bricks- Cement concrete- Steel. Introduction to Prefabricated construction Techniques.

UNIT II

Surveying: Objectives of Surveying- Horizontal Measurements- Angular Measurements- Introduction to Bearings Levelling instruments used for levelling -Simple problems on levelling and bearings- Contour mapping.

UNIT III

Transportation Engineering Importance of Transportation in Nation's economic development- Types of Highway Pavements- Flexible Pavements and Rigid Pavements - Simple Differences. Basics of Harbour, Tunnel, Airport, and Railway Engineering.
Water Resources and Environmental Engineering: Introduction, Sources of water- Quality of water- Specifications- Introduction to Hydrology–Rainwater Harvesting-Water Storage and Conveyance Structures (Simple introduction to Dams and Reservoirs).

Textbooks:

1. Basic Civil Engineering, M.S.Palanisamy, , Tata Mcgraw Hill publications (India) Pvt. Ltd. Fourth Edition.
2. Introduction to Civil Engineering, S.S. Bhavikatti, New Age International Publishers. 2022. First Edition.
3. Basic Civil Engineering, Satheesh Gopi, Pearson Publications, 2009, First Edition.

Reference Books:

1. Surveying, Vol- I and Vol-II, S.K. Duggal, Tata McGraw Hill Publishers 2019. Fifth Edition.
2. Hydrology and Water Resources Engineering, Santosh Kumar Garg, Khanna Publishers, Delhi. 2016
3. Irrigation Engineering and Hydraulic Structures - Santosh Kumar Garg, Khanna Publishers, Delhi 2023. 38th Edition.
4. Highway Engineering, S.K.Khanna, C.E.G. Justo and Veeraraghavan, Nemchand and Brothers Publications 2019. 10th Edition.
5. Indian Standard DRINKING WATER — SPECIFICATION IS 10500-2012.

Online learning resources :

1. https://archive.nptel.ac.in/courses/105/102/105102012/

2.https://archive.nptel.ac.in/content/storage2/courses/105104098/TransportationII/lecture6/2slide.htm

PART B: BASIC MECHANICAL ENGINEERING

Course Objectives: The students after completing the course are expected to

- Get familiarized with the scope and importance of Mechanical Engineering in different sectors and industries.
- Explain different engineering materials and different manufacturing processes.
- Provide an overview of different thermal and mechanical transmission systems and introduce basics of robotics and its applications.

Course Outcomes: On completion of the course, the student should be able to:

CO4: Understand the different manufacturing processes.

CO5: Explain the basics of thermal engineering and its applications and the working of different mechanical power transmission systems and power plants.

CO6: Describe the basics of robotics and its applications

CO/ PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO 12	PS O1	PS O2
CO4	2	-	-	-	-	2	2	-	-	-	-	-	1	-
CO5	2	1	-	-	1	1	-	-	-	-	-	-	-	-
CO6	1	-	-	-	-	1	1	-	-	-	-	-	-	-

UNIT I

Introduction to Mechanical Engineering: Role of Mechanical Engineering in Industries and Society-Technologies in different sectors such as Energy, Manufacturing, Automotive, Aerospace, and Marine sectors.

Engineering Materials - Metals-Ferrous and Non-ferrous, Ceramics, Composites, Smart materials.

UNIT II

Manufacturing Processes: Principles of Casting, Forming, joining processes, Machining, Introduction to CNC machines, 3D printing, and Smart manufacturing.

Thermal Engineering – Working principle of Boilers, Otto cycle, Diesel cycle, Refrigeration and air-conditioning cycles, IC engines, 2-Stroke and 4-Stroke engines, SI/CI Engines, Components of Electric and Hybrid Vehicles.

UNIT III

Power plants – Working principle of Steam, Diesel, Hydro, Nuclear power plants. Mechanical Power Transmission - Belt Drives, Chain, Rope drives, Gear Drives and their applications.

Introduction to Robotics - Joints & links, configurations, and applications of robotics.

(Note: The subject covers only the basic principles of Civil and Mechanical Engineering systems. The evaluation shall be intended to test only the fundamentals of the subject.)

Textbooks:

1. Internal Combustion Engines by V.Ganesan, By Tata McGraw Hill publications (India) Pvt. Ltd.
2. A text book of Theory of Machines by S.S. Rattan, Tata McGraw Hill Publications, (India) Pvt. Ltd.
3. An introduction to Mechanical Engg by Jonathan Wicker and Kemper Lewis, Cengage learning India Pvt. Ltd.

Reference Books:

1. G. Shanmugam and M.S.Palanisamy, Basic Civil and the Mechanical Engineering, Tata McGraw Hill publications (India) Pvt. Ltd.
2. Thermal Engineering by Mahesh M Rathore Tata McGraw Hill publications (India) Pvt. Ltd.
3. 3D printing & Additive Manufacturing Technology- L. Jyothish Kumar, Pulak M Pandey, Springer publications
4. Appuu Kuttan KK, Robotics, I.K. International Publishing House Pvt. Ltd. Volume-I

DEPARTMENT OF COMPUTER SCIENCE ENGINEERING

I Year- I Semester	Course Code: BT24CS1101	L	T	P	C
		3	0	0	3
INTRODUCTION TO PROGRAMMING *(Common to All branches of Engineering)*					

Course Objectives:

- To introduce students to the fundamentals of computer programming.
- To provide hands-on experience with coding and debugging.
- To foster logical thinking and problem-solving skills using programming.
- To familiarize students with programming concepts such as data types, control structures, functions, and arrays.
- To encourage collaborative learning and teamwork in coding projects.

Course Outcomes: A student after completion of the course will be able to

CO1: Understand basics of computers, the concept of algorithm and algorithmic thinking (L2)
CO2: Analyse a problem and develop analgorithm to solve it (L4).
CO3: Implement various algorithms using the C programming language (L4).
CO4: Understand more advanced features of C language (L2).
CO5: Develop problem-solving skills and the ability to debug and optimize the code (L6).
CO6: Apply file input–output operations (L3)

CO/ PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PS O1	PS O2
CO1	2	2	3	1	-	-	-	2	-	-	-	2	2	2
CO2	2	3	3	2	-	-	-	2	-	-	-	2	2	-
CO3	2	3	3	2	-	-	-	3	-	-	-	2	2	2
CO4	2	3	2	2	-	-	-	2	-	-	-	2	2	2
CO5	3	3	3	2	-	-	-	3	-	-	-	2	3	3
CO6	2	3	3	3	-	-	-	2	-	-	-	2	2	2

UNIT I Introduction to Programming and Problem Solving

History of Computers, Basic organization of a computer: ALU, input-output units, memory, program counter, Introduction to Programming Languages, Basics of a Computer Program- Algorithms, flowcharts (Using Dia Tool), pseudo code. Introduction to Compilation and Execution, Primitive Data Types, Variables, and Constants, Basic Input and Output, Operations, Type Conversion, and Casting. Problem solving techniques: Algorithmic approach, characteristics of algorithm, Problem solving strategies: Top-down approach, Bottom-up approach, Time and space complexities of algorithms.

UNIT II Control Structures

Simple sequential programs Conditional Statements (if, if-else, switch), Loops (for, while, do-while) Break and Continue.

UNIT III Arrays and Strings

Arrays indexing, memory model, programs with array of integers, two dimensional arrays, Introduction to Strings.

UNIT IV Pointers & User Defined Data types

Pointers, dereferencing and address operators, pointer and address arithmetic, array manipulation using pointers, User-defined data types-Structures and Unions.

UNIT V Functions & File Handling

Introduction to Functions, Function Declaration and Definition, Function call Return Types and Arguments, modifying parameters inside functions using pointers, arrays as parameters. Scope and Lifetime of Variables, Basics of File Handling

Note: The syllabus is designed with C Language as the fundamental language of implementation**.**

Textbooks:

1. The C Programming Language", Brian W. Kernighan and Dennis M. Ritchie, Prentice-Hall, 1988
2. Schaum's Outline of Programming with C, Byron S Gottfried, McGraw-Hill Education, 1996

Reference Books:

1. Computing fundamentals and C Programming, Balagurusamy, E., McGraw-Hill Education, 2008.
2. Programming in C, Rema Theraja, Oxford, 2016, 2nd edition
3. C Programming, A Problem Solving Approach, Forouzan, Gilberg, Prasad, CENGAGE, 3rd edition

DEPARTMENT OF BASIC SCIENCE AND HUMANITIES

I Year- I Semester	Course Code: BT24BS1105	L	T	P	C
		0	0	2	1
COMMUNICATIVE ENGLISH LAB *(Common to All Branches of Engineering)*					

Course Objectives: The main objective of introducing this course, Communicative English Laboratory, is to expose the students to a variety of self-instructional, learner friendly modes of language learning. The students will get trained in basic communication skills and also make them ready to face job interviews.

Course Outcomes:

CO1: Distinguish the English speech sounds, stress, rhythm, intonation and syllable division for better listening and speaking comprehension in day to day conversations.
CO2: Demonstrate communication skills through various language learning activities
CO3: Apply the writing skills in e-mail Writing and Resume Writing.
CO4: Appraise and manifest professionalism in participating group discussions and debates.
CO5: Exhibit the effective interpersonal skills in presentations and interviews
CO6: Understand the different aspects of the English language proficiency with emphasis on LSRW skills.

CO/ PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO 11	PO 12	PS O1	PS O2
CO1	-	-	-	-	3	-	-	-	1	1	-	-	-	-
CO2	-	-	-	-	-	-	-	-	3	3	-	1	-	-
CO3	-	-	-	-	1	-	-	-	1	2	-	2	-	-
CO4	-	-	-	-	-	-	-	-	3	3	-	2	-	-
CO5	-	-	-	-	-	-	-	-	3	3	-	2	-	-
CO6	-	-	-	-	2	-	-	-	-	2	-	2	-	-

List of Topics:

1. Vowels & Consonants
2. Neutralization/Accent Rules
3. Communication Skills & JAM
4. Role Play or Conversational Practice
5. E-mail Writing
6. Resume Writing, Cover letter, SOP
7. Group Discussions-methods & practice
8. Debates - Methods & Practice
9. PPT Presentations/ Poster Presentation
10. Interviews Skills

Suggested Software:

- Walden Infotech
- Young India Films

Reference Books:

1. Raman Meenakshi, Sangeeta-Sharma. Technical Communication. Oxford Press.2018.
2. Taylor Grant: English Conversation Practice, Tata McGraw-Hill Education India, 2016
3. Hewing's, Martin. Cambridge Academic English (B2). CUP, 2012.
4. J. Sethi & P.V. Dhamija. A Course in Phonetics and Spoken English, (2nd Ed),Kindle, 2013

Online learning resources :

Spoken English:

www.esl-lab.com

www.englishmedialab.com

www.englishinteractive.net

https://www.britishcouncil.in/english/online

http://www.letstalkpodcast.com/

https://www.youtube.com/c/mmmEnglish_Emma/featured

https://www.youtube.com/c/ArnelsEverydayEnglish/featured

https://www.youtube.com/c/engvidAdam/featured

https://www.youtube.com/c/EnglishClass101/featured

https://www.youtube.com/c/SpeakEnglishWithTiffani/playlists

https://www.youtube.com/channel/UCV1h_cBE0Drdx19qkTM0WNw

Voice & Accent:

https://www.youtube.com/user/letstalkaccent/videos

https://www.youtube.com/c/EngLanguageClub/featured

https://www.youtube.com/channel/UC_OskgZBoS4dAnVUgJVexc

https://www.youtube.com/channel/UCNfm92h83W2i2ijc5Xwp_IA

DEPARTMENT OF BASIC SCIENCE AND HUMANITIES

I Year- I Semester	Course Code: BT24BS1106	L	T	P	C
		0	0	2	1
CHEMISTRY LAB *(Common to CSE, AIML, AIDS)*					

Course Objectives:

- Verify the fundamental concepts with experiments.

Course Outcomes: At the end of the course, the students will be able to
CO1: Determine the cell constant and conductance of solutions
CO2: Prepare advanced polymer materials.
CO3: Measure the strength of an acid present in secondary batteries
CO4: Analyze the IR spectra of some organic compounds.
CO5: Calculate strength of acid in Pb-Acid battery.
CO6: Understand the synthesis of Bakelite

CO/ PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO 12	PS O1	PS O2
CO1	3	2	2	-	-	-	-	-	-	-	-	2	-	-
CO2	3	3	2	-	-	-	-	-	-	-	-	2	-	-
CO3	3	2	2	-	-	-	-	-	-	-	-	2	-	-
CO4	3	3	2	-	-	-	-	-	-	-	-	2	-	-
CO5	3	2	2	-	-	-	-	-	-	-	-	2	-	-
CO6	3	2	2	-	-	-	-	-	-	-	-	2	-	-

List of Experiments:

1. Measurement of 10Dq by spectrophotometric method
2. Conductometric titration of strong acid vs. strong base
3. Conductometric titration of weak acid vs. strong base
4. Determination of cell constant and conductance of solutions
5. Potentiometry - determination of redox potentials and emfs
6. Determination of Strength of an acid in Pb-Acid battery
7. Preparation of a Bakelite
8. Verify Lambert-Beer's law
9. Wavelength measurement of sample through UV-Visible Spectroscopy
10. Identification of simple organic compounds by IR
11. Preparation of nanomaterials by precipitation method
12. Estimation of Ferrous Iron by Dichrometry

Reference:

1. "Vogel's Quantitative Chemical Analysis 6th Edition 6th Edition" Pearson Publications by J. Mendham, R.C.Denney, J.D.Barnes and B. Sivasanka

DEPARTMENT OF MECHANICAL ENGINEERING

I Year- I Semester	Course Code: BT24ME1103	L	T	P	C
		0	0	3	1.5
ENGINEERING WORKSHOP *(Common to All branches of Engineering)*					

Course Objectives:
To familiarize students with wood working, sheet metal operations, fitting, electrical house wiring skills, and basic repairs of two-wheeler vehicle.

Course Outcomes:
CO1: Build carpentry fitting and forging operations in various applications.
CO2: Executing operations of foundry and sheet metal works using varies tools.
CO3: Inspect basic electrical engineering knowledge for house wiring practice
CO4: Develop a lap and butt joint using arc welding.
CO5: Develop pipe joint for different diameter of pipes
CO6: Inspect basic repair of two-wheeler vehicle **.**

CO/ PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO 12	PS O1	PS O2
CO1	3	-	3	-	2	-	-	3	-	-	-	1	-	-
CO2	3	-	3	-	2	-	-	3	-	-	-	1	-	-
CO3	3	-	3	-	2	-	-	3	-	-	-	1	-	-
CO4	3	-	3	-	2	-	-	3	-	-	-	1	-	-
CO5	3	-	3	-	2	-	-	3	-	-	-	1	-	-
CO6	3	-	3	-	2	-	-	3	-	-	-	1	-	-

SYLLABUS
1. Demonstration: Safety practices and precautions to be observed in workshop.
2. Wood Working: Familiarity with different types of woods and tools used in wood working and make following joints.
   a) Half – Lap joint b) Mortise and Tenon joint c) Corner Dovetail joint or Bridle joint
3. Sheet Metal Working: Familiarity with different types of tools used in sheet metal working, Developments of following sheet metal job from GI sheets.
   a) Tapered tray b) Conical funnel c) Elbow pipe d) Brazing
4. Fitting: Familiarity with different types of tools used in fitting and do the following fitting exercises.
   a) V-fit b) Dovetail fit c) Semi-circular fit d) Bicycle tire puncture and change of two-‘ wheeler tyre
5. Electrical Wiring: Familiarity with different types of basic electrical circuits and make the following connections.
   a) Parallel and series b) Two-way switch c) Godown lighting d) Tube light e) Three phase motor f) Soldering of wires
6. Foundry Trade: Demonstration and practice on Moulding tools and processes, Preparation of Green Sand Moulds for given Patterns.

7. Welding Shop: Demonstration and practice on Arc Welding and Gas welding. Preparation of Lap joint and Butt joint.
8. Plumbing: Demonstration and practice of Plumbing tools, Preparation of Pipe joints with coupling for same diameter and with reducer for different diameters.
9. Basic repairs of Two-wheeler vehicle – Demonstration of working of two-wheeler vehicle and its repairs.

Textbooks:

1. Basic Workshop Technology: Manufacturing Process, Felix W.; Independently Published,2019. Workshop Processes, Practices and Materials; Bruce J. Black, Routledge publishers, 5th Edn. 2015.
2. A Course in Workshop Technology Vol I. & II, B.S. Raghuwanshi, Dhanpath Rai & Co., 2015 & 2017.

Reference Books:

1. Elements of Workshop Technology, Vol. I by S. K. Hajra Choudhury & Others, Media Promoters and Publishers, Mumbai. 2007, 14th edition
2. Workshop Practice by H. S. Bawa, Tata-McGraw Hill, 2004.
3. Wiring Estimating, Costing and Contracting; Soni P.M. & Upadhyay P.A.; Atul Prakashan, 2021-22.

DEPARTMENT OF COMPUTER SCIENCE ENGINEERING

I Year- I Semester	Course Code: BT24CS1103	L	T	P	C
		0	0	3	1.5
COMPUTER PROGRAMMING LAB *(Common to All branches of Engineering)*					

Course Objectives:
The course aims to give students hands – on experience and train them on the concepts of the C-programming language.

Course Outcomes:
CO1: Read understand and trace they execution of programs written in C language
CO2: Select the right control structure for solving the problem.
CO3: Develop C programs which utilize memory efficiently using programming constructs like pointers.
CO4: Develop, D-Bug and execute programs to demonstrate applications of arrays, functions, basic concepts of pointers in C.
CO5: Develop a programs to demonstrate the applications of string operations in C.
CO6: Develop a programs to demonstrate the applications of file operations in C.

CO/ PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO 8	PO 9	PO 10	PO 11	PO 12	PS O1	PS O2
CO1	2	3	-	2	-	-	-	-	-	-	-	-	-	2
CO2	2	3	3	3	-	-	-	-	-	-	-	-	-	-
CO3	2	3	3	2	3	-	-	-	-	-	-	-	-	-
CO4	2	3	3	3	2	-	-	-	-	-	-	-	2	-
CO5	2	3	3	2	2	-	-	-	-	-	-	-	2	-
CO6	-	2	3	2	2	-	-	-	-	-	-	-	-	-

UNIT I
WEEK 1
Objective: Getting familiar with the programming environment on the computer and writing the first program.

Suggested Experiments/Activities:
Tutorial 1: Problem-solving using Computers.
Lab1: Familiarization with programming environment
i. Basic Linux environment and its editors like Vi, Vim & Emacs etc.
ii. Exposure to Turbo C, gcc
iii. Writing simple programs using printf(), scanf()

WEEK 2
Objective: Getting familiar with how to formally describe a solution to a problem in a series of finite steps both using textual notation and graphic notation.

Suggested Experiments /Activities:
Tutorial 2: Problem-solving using Algorithms and Flow charts.
Lab 1: Converting algorithms/flow charts into C Source code.
Developing the algorithms/flowcharts for the following sample programs

i. Sum and average of 3 numbers
ii. Conversion of Fahrenheit to Celsius and vice versa
iii. Simple interest calculation

WEEK 3

Objective: Learn how to define variables with the desired data-type, initialize them with appropriate values and how arithmetic operators can be used with variables and constants.

Suggested Experiments/Activities:

Tutorial 3: Variable types and type conversions:

Lab 3: Simple computational problems using arithmetic expressions.

i. Finding the square root of a given number
ii. Finding compound interest
iii. Area of a triangle using heron's formulae
iv. Distance travelled by an object

UNIT II

WEEK 4

Objective: Explore the full scope of expressions, type-compatibility of variables & constants and operators used in the expression and how operator precedence works.

Suggested Experiments/Activities:

Tutorial4: Operators and the precedence and as associativity:

Lab4: Simple computational problems using the operator' precedence and associativity

Evaluate the following expressions.

i. A+B*C+(D*E) + F*G
ii. A/B*C-B+A*D/3
iii. A+++B---A
iv. J= (i++) + (++i)

Find the maximum of three numbers using conditional operator

Take marks of 5 subjects in integers, and find the total, average in float

WEEK 5

Objective: Explore the full scope of different variants of "if construct" namely if-else, null-else, if-else if*-else, switch and nested-if including in what scenario each one of them can be used and how to use them. Explore all relational and logical operators while writing conditionals for "if construct".

Suggested Experiments/Activities:

Tutorial 5: Branching and logical expressions:

Lab 5: Problems involving if-then-else structures.

i. Write a C program to find the max and min of four numbers using if-else.
ii. Write a C program to generate electricity bill.
iii. Find the roots of the quadratic equation.
iv. Write a C program to simulate a calculator using switch case.
v. Write a C program to find the given year is a leap year or not.

WEEK 6

Objective: Explore the full scope of iterative constructs namely while loop, do-while loop and or loop in addition to structured jump constructs like break and continue including when each of these statements is more appropriate to use.

Suggested Experiments/Activities:

Tutorial 6: Loops, while and for loops

Lab 6: Iterative problems e.g., the sum of series

i. Find the factorial of given number using any loop.
ii. Find the given number is a prime or not.
iii. Compute sine and cos series
iv. Checking a number palindrome
v. Construct a pyramid of numbers.

UNIT III

WEEK 7:

Objective: Explore the full scope of Arrays construct namely defining and initializing 1-D and 2-D and more generically n-D arrays and referencing individual array elements from the defined array. Using integer 1-D arrays, explore search solution linear search.

Suggested Experiments/Activities:

Tutorial 7: 1 D Arrays: searching.

Lab 7:1D Array manipulation, linear search

i. Find the min and max of a 1-D integer array.
ii. Perform linear search on1D array.
iii. The reverse of a 1D integer array
iv. Find 2's complement of the given binary number.
v. Eliminate duplicate elements in an array.

WEEK 8:

Objective: Explore the difference between other arrays and character arrays that can be used as Strings by using null character and get comfortable with string by doing experiments that will reverse a string and concatenate two strings. Explore sorting solution bubble sort using integer arrays.

Suggested Experiments/Activities:

Tutorial 8: 2 D arrays, sorting and Strings.

Lab 8: Matrix problems, String operations, Bubble sort

i. Addition of two matrices
ii. Multiplication two matrices
iii. Sort array elements using bubble sort
iv. Concatenate two strings without built-in functions
v. Reverse a string using built-in and without built-in string functions

UNIT IV
WEEK 9:
Objective: Explore pointers to manage a dynamic array of integers, including memory allocation & value initialization, resizing changing and reordering the contents of an array and memory de-allocation using malloc (), calloc (), realloc () and free () functions. Gain experience processing command-line arguments received by C

Suggested Experiments/Activities:
Tutorial 9: Pointers, structures and dynamic memory allocation
Lab 9: Pointers and structures, memory dereference.

i. Write a C program to find the sum of a 1D array using malloc()
ii. Write a C program to find the total, average of n students using structures
iii. Enter n students data using calloc() and display failed students list
iv. Read student name and marks from the command line and display the student details along with the total.
v. Write a C program to implement realloc()

WEEK 10:
Objective: Experiment with C Structures, Unions, bit fields and self-referential structures (Singly linked lists) and nested structures

Suggested Experiments/Activities:
Tutorial 10: Bitfields, Self-Referential Structures, Linked lists
Lab10 : Bitfields, linked lists
Read and print a date using dd/mm/yyyy format using bit-fields and differentiate the same without using bit- fields

i. Create and display a singly linked list using self-referential structure.
ii. Demonstrate the differences between structures and unions using a C program.
iii. Write a C program to shift/rotate using bitfields.
iv. Write a C program to copy one structure variable to another structure of the same type.

UNIT V
WEEK 11:
Objective: Explore the Functions, sub-routines, scope and extent of variables, doing some experiments by parameter passing using call by value. Basic methods of numerical integration

Suggested Experiments/Activities:
Tutorial 11: Functions, call by value, scope and extent,
Lab 11: Simple functions using call by value, solving differential equations using Eulers theorem.

i. Write a C function to calculate NCR value.
ii. Write a C function to find the length of a string.
iii. Write a C function to transpose of a matrix.
iv. Write a C function to demonstrate numerical integration of differential equations using Euler's method

WEEK 12:
Objective: Explore how recursive solutions can be programmed by writing recursive functions that can be invoked from the main by programming at-least five distinct problems that have naturally recursive solutions.
Suggested Experiments/Activities:
Tutorial 12: Recursion, the structure of recursive calls
Lab 12: Recursive functions

i. Write a recursive function to generate Fibonacci series.
ii. Write a recursive function to find the lcm of two numbers.
iii. Write a recursive function to find the factorial of a number.
iv. Write a C Program to implement Ackermann function using recursion.
v. Write a recursive function to find the sum of series.

WEEK 13:
Objective: Explore the basic difference between normal and pointer variables, Arithmetic operations using pointers and passing variables to functions using pointers
Suggested Experiments/Activities:
Tutorial 13: Call by reference, dangling pointers
Lab 13: Simple functions using Call by reference, Dangling pointers.

i. Write a C program to swap two numbers using call by reference.
ii. Demonstrate Dangling pointer problem using a C program.
iii. Write a C program to copy one string into another using pointer.
iv. Write a C program to find no of lowercase, uppercase, digits and other characters using pointers.

WEEK14:
Objective: To understand data files and file handling with various file I/O functions. Explore the differences between text and binary files.
Suggested Experiments/Activities:
Tutorial 14: File handling
Lab 14: File operations

i. Write a C program to write and read text into a file.
ii. Write a C program to write and read text into a binary file using fread() and fwrite()
iii. Copy the contents of one file to another file.
iv. Write a C program to merge two files into the third file using command-line arguments.
v. Find no. of lines, words and characters in a file
vi. Write a C program to print last n characters of a given file.

Textbooks:

1. Ajay Mittal, Programming in C: A practical approach, Pearson.
2. Byron Gottfried, Schaum' s Outline of Programming with C, McGraw Hill

Reference Books:

1. Brian W. Kernighan and Dennis M. Ritchie, The C Programming Language, Prentice- Hall of India
2. C Programming, A Problem-Solving Approach, Forouzan, Gilberg, Prasad, CENGAGE.

DEPARTMENT OF BASIC SCIENCE AND HUMANITIES

I Year- I Semester	Course Code: BT24BS1108	L	T	P	C
		0	0	1	0.5
HEALTH AND WELLNESS, YOGA AND SPORTS *(Common to All branches of Engineering)*					

Course Objectives: The main objective of introducing this course is to make the students maintain their mental and physical wellness by balancing emotions in their life. It mainly enhances the essential traits required for the development of the personality.

Course Outcomes: After completion of the course the student will be able to
CO1: Understand the importance of yoga and sports for Physical fitness and sound health.
CO2: Demonstrate an understanding of health-related fitness components.
CO3: Compare and contrast various activities that help enhance their health.
CO4: Assess current personal fitness levels.
CO5: Develop Positive Personality.
CO6: Describe the history of sports, Ancient and Modern Olympics

CO/ PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO 12	PS O1	PS O2
CO1	-	-	-	-	-	-	-	-	-	-	-	2	-	-
CO2	-	-	-	-	-	-	-	-	-	-	-	2	-	-
CO3	-	-	-	-	-	-	-	-	-	-	-	2	-	-
CO4	-	-	-	-	-	-	-	-	-	-	-	2	-	-
CO5	-	-	-	-	-	-	-	-	-	-	-	2	-	-
CO6	-	-	-	-	-	-	-	-	-	-	-	2	-	-

UNIT I Concept of health and fitness, Nutrition and Balanced diet, basic concept of immunity Relationship between diet and fitness, Globalization and its impact on health, Body Mass Index (BMI) of all age groups.
Activities:
i) Organizing health awareness programmes in community
ii) Preparation of health profile
iii) Preparation of chart for balance diet for all age groups

UNIT II Concept of yoga, need for and importance of yoga, origin and history of yoga in Indian context, classification of yoga, Physiological effects of Asanas- Pranayama and meditation, stress management and yoga, Mental health and yoga practice.
Activities: Yoga practices – Asana, Kriya, Mudra, Bandha, Dhyana, Surya Namaskar

UNIT III Concept of Sports and fitness, importance, fitness components, history of sports, Ancient and Modern Olympics, Asian games and Commonwealth games.
Activities:
i) Participation in one major game and one individual sport viz., Athletics, Volleyball, Basketball, Handball, Football, Badminton, Kabaddi, Kho-kho, Table tennis, Cricket etc. Practicing general and specific warm up, aerobics
ii) Practicing cardiorespiratory fitness, treadmill, run test, 9 min walk, skipping and running.

Reference Books:

- Gordon Edlin, Eric Golanty. Health and Wellness, 14th Edn. Jones & Bartlett Learning, 2022
- T.K.V.Desikachar. The Heart of Yoga: Developing a Personal Practice
- Archie J.Bahm. Yoga Sutras of Patanjali, Jain Publishing Company, 1993
- Wiseman, John Lofty, SAS Survival Handbook: The Ultimate Guide to Surviving Anywhere Third Edition, William Morrow Paperbacks, 2014
- The Sports Rules Book/ Human Kinetics with Thomas Hanlon. -- 3rd ed. Human Kinetics, Inc.2014

General Guidelines:

- Institutes must assign slots in the Timetable for the activities of Health/Sports/Yoga.
- Institutes must provide field/facility and offer the minimum of five choices of as many as Games/Sports.
- Institutes are required to provide sports instructor / yoga teacher to mentor the students. Evaluation

Guidelines:

- Evaluated for a total of 100 marks.
- A student can select 6 activities of his/her choice with a minimum of 01 activity per unit. Each activity shall be evaluated by the concerned teacher for 15 marks, totalling to 90 marks.
- A student shall be evaluated by the concerned teacher for 10 marks by conducting viva voce on the subject

DEPARTMENT OF BASIC SCIENCE AND HUMANITIES

I Year- I Semester	Course Code: BT24BS1104	L	T	P	C
		3	0	0	3
ENGINEERING PHYSICS *(Common for all branches of Engineering)*					

Course Objectives: To bridge the gap between the Physics in school at 10+2 level and UG level engineering courses by identifying the importance of the optical phenomenon like interference, diffraction etc, enlightening the periodic arrangement of atoms in crystalline solids and concepts of quantum mechanics, introduce novel concepts of dielectric and magnetic materials, physics of semiconductors.

Course Outcomes:
CO1: Analyze the intensity variation of light due to polarization, interference and diffraction.
CO2: Examine the crystal structures with the basics of crystals..
CO3: Summarize various types of polarization of dielectrics and classify the magnetic materials.
CO4: Using fundamentals of quantum mechanics solve the one dimensional motion of particles.
CO5: Apply the basic concepts of quantum free electron theory to Fermi energy and classification of crystalline solids.
CO6: Identify the type of semiconductor using Hall effect.

CO/ PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO 10	PO 11	PO 12	PS O1	PS O2
CO1	3	2	2	1	-	-	-	-	-	-	-	1	-	-
CO2	3	2	2	1	-	-	-	-	-	-	-	1	-	-
CO3	3	2	2	-	-	-	-	-	-	-	-	1	-	-
CO4	3	2	2	-	-	-	-	-	-	-	-	1	-	-
CO5	3	2	2	-	-	-	-	-	-	-	-	1	-	-
CO6	3	2	2	-	-	-	-	-	-	-	-	1	-	-

UNIT I Wave Optics 12hr

Interference: Introduction - Principle of superposition –Interference of light - Interference in thin films (Reflection Geometry) & applications - Colours in thin films- Newton's Rings, Determination of wavelength and refractive index.

Diffraction: Introduction - Fresnel and Fraunhofer diffractions - Fraunhofer diffraction due to single slit, double slit & N-slits (Qualitative) – Diffraction Grating - Dispersive power and resolving power of Grating (Qualitative).

Polarization: Introduction -Types of polarization - Polarization by reflection, refraction and Double refraction - Nicol's Prism -Half wave and Quarter wave plates.

UNIT II Crystallography and X-ray diffraction 10hr

Crystallography: Space lattice, Basis, Unit Cell and lattice parameters – Bravais Lattices – crystal systems (3D) – coordination number - packing fraction of SC, BCC & FCC - Miller indices – separation between successive (hkl) planes.

X-ray diffraction: Bragg's law - X-ray Diffractometer – crystal structure determination by Laue's and powder methods

UNIT III Dielectric and Magnetic Materials 8hr

Dielectric Materials: Introduction - Dielectric polarization - Dielectric polarizability, Susceptibility, Dielectric constant and Displacement Vector – Relation between the electric vectors - Types of polarizations- Electronic (Quantitative), Ionic (Quantitative) and Orientation polarizations (Qualitative) - Lorentz internal field - Clausius- Mossotti equation.

Magnetic Materials: Introduction - Magnetic dipole moment - Magnetization-Magnetic susceptibility and permeability – Atomic origin of magnetism - Classification of magnetic materials: Dia, para, Ferro, anti-ferro & Ferri magnetic materials - Domain concept for Ferromagnetism & Domain walls (Qualitative) - Hysteresis - soft and hard magnetic materials.

UNIT IV Quantum Mechanics and Free electron Theory 10hr

Quantum Mechanics: Dual nature of matter – Heisenberg's Uncertainty Principle – Significance and properties of wave function – Schrodinger's time independent and dependent wave equations– Particle in a one-dimensional infinite potential well.

Free Electron Theory: Classical free electron theory (Qualitative with discussion of merits and demerits) – Quantum free electron theory – electrical conductivity based on quantum free electron theory - Fermi-Dirac distribution - Density of states - Fermi energy

UNIT V Semiconductors 8hr

Semiconductors: Formation of energy bands – classification of crystalline solids - Intrinsic semiconductors: Density of charge carriers – Electrical conductivity – Fermi level – Extrinsic semiconductors: density of charge carriers – dependence of Fermi energy on carrier concentration and temperature - Drift and diffusion currents – Einstein's equation – Hall effect and its applications.

Textbooks:

1. Engineering Physics, Dr.D. Tirupathi Naidu and M. Veeranjaneyulu, VGS Publications, 2023.
2. A Text book of Engineering Physics, M. N. Avadhanulu, P.G.Kshirsagar & TVS Arun Murthy, S.Chand Publications, 11th Edition 2019.
3. Engineering Physics - D.K.Bhattacharya and Poonam Tandon, Oxford press (2015)

Reference Books:

1. Engineering Physics - B.K. Pandey and S. Chaturvedi, Cengage Learning 2021.
2. Engineering Physics - Shatendra Sharma, Jyotsna Sharma, Pearson Education, 2018.
3. Engineering Physics - Sanjay D. Jain, D. Sahasrabudhe and Girish, University Press. 2010
4. Engineering Physics - M.R. Srinivasan, New Age international publishers (2009).

Online learning resources:

https://dnrcet.org/web/departments/hs/courses/b-tech/syllabus/

DEPARTMENT OF ELECTRICAL ELECTRONICS ENGINEERING

I Year- I Semester	Course Code: BT24EE1101	L	T	P	C
		3	0	0	3
BASIC ELECTRICAL & ELECTRONICS ENGINEERING *(Common to All branches of Engineering)*					

Course Objectives: Students will learn

- About the basic principles of Direct Current (DC) & Alternating Current (AC) Circuit analysis
- About the fundamentals of magnetic circuits analysis.
- About Electrical Wiring and Electrical Safety.

Course Outcomes: At the end of the course, the student will be able to
CO1: Apply the circuit laws for the analysis of simple DC and AC circuits.
CO2: Apply the basic principles for solving fundamental magnetic circuits**.**
CO3: Apply the basic principles of electrical wiring and electric safety measures**.**

CO/ PO	PO1	PO2	PO3	PO4	PO 5	PO6	PO7	PO8	PO9	PO10	PO11	PO 12	PS O1	PS O2
CO1	3	3	3	2	-	1	-	-	3	3	3	1	1	2
CO2	3	3	2	2	-	2	-	-	2	3	3	1	1	1
CO3	3	2	2	1	-	3	-	-	2	3	3	1	1	2

PART A: BASIC ELECTRICAL ENGINEERING

UNIT I INTRODUCTION TO ELECTRICAL CIRCUITS

Basic Concepts of passive elements of R, L, C and their V-I relations, Sources (dependent and independent), Kirchhoff's laws, Network reduction techniques (series, parallel, series - parallel, star-to-delta and delta-to-star transformation), source transformation technique, nodal analysis and mesh analysis to DC networks with dependent and independent voltage and current sources.

UNIT II MAGNETIC CIRCUITS

Basic definition of MMF, flux and reluctance, analogy between electrical and magnetic circuits, Faraday's laws of electromagnetic induction – concept of self and mutual inductance, Dot convention – coefficient of coupling and composite magnetic circuit, analysis of series and parallel magnetic circuits.

UNIT III ELECTRICAL WIRING, ELECTRICITY BILL & SAFETY MEASURES

Electrical Wiring: SimpleLamp circuits, stair case wiring scheme, godown wiring scheme, types of service mains, types of electrical wiring, cost estimation of indoor wiring, wiring layout of workshop/ electrical laboratory.
Electricity bill: Power rating of household appliances including air conditioners, PCs, Laptops, Printers,etc., Types of electricity tariff, calculation of electricity bill for domestic consumers.
Equipment Safety Measures: Working principle of Fuse and Miniature circuit breaker (MCB), merits and demerits. Personal safety measures: Electric Shock, Earthing and its types, Safety Precautions to avoid shock

PART B: BASIC ELECTRONICS ENGINEERING

Course Outcomes: At the end of the course, the student will be able to
CO4: Analyze various characteristics of semiconductor devices.
CO5: Apply the basic principles for understanding and working of rectifiers and power Supplies.
CO6: Explain the working of various logic gates**.**

	PO1	PO2	PO3	PO4	PO 5	PO6	PO7	PO8	PO9	PO10	PO 11	PO 12	PS O1	PS O2
CO4	2	1	2	1	-	1	-	-	-	-	1	3	2	-
CO5	3	1	2	1	-	1	-	-	-	-	1	3	2	-
CO6	2	2	2	1	-	1	-	-	-	-	1	3	2	-

UNIT I SEMI CONDUCTOR DEVICES

Introduction - Evolution of electronics – Vacuum tubes to nano electronics - Characteristics of PN Junction Diode — Zener Effect — Zener Diode and its Characteristics. Bipolar Junction Transistor — CB, CE, CC Configurations and Characteristics — Elementary Treatment of Small Signal CE Amplifier

UNIT II BASIC ELECTRONIC CIRCUITS AND INSTRUMENTTAION

Rectifiers and power supplies: Block diagram description of a dc power supply, working of a full wave bridge rectifier, capacitor filter (no analysis), working of simple Zener voltage regulator. Amplifiers: Block diagram of Public Address system, Circuit diagram and working of common emitter (RC coupled) amplifier with its frequency response. Electronic Instrumentation: Block diagram of an electronic instrumentation system.

UNIT III DIGITAL ELECTRONICS

Overview of Number Systems, Logic gates including Universal Gates, BCD codes, Excess-3 code, Gray code, Hamming code. Boolean Algebra, Basic Theorems and properties of Boolean Algebra, Truth Tables and Functionality of Logic Gates – NOT, OR, AND, NOR, NAND, XOR and XNOR. Simple combinational circuits–Half and Full Adders. Introduction to sequential circuits, Flip flops, Registers and counters (Elementary Treatment only)

Textbooks:

1.Principles of Electrical and Electronics Engineering, V.K. Mehtha, S. Chand Technical Publishers
2.Basic Electrical Engineering, Ritu SahDev, Khanna Publishers, 2018, First Edition.
3.FundamentalsofElectricalCircuits,CharlesK.AlexanderandMathewN.O.Sadiku,McGrawHill Education (India),2013,Fifth Edition
4.Electrical Wiring Estimating and Costing –Dr. S. L. Uppal-Khanna Publishers-198
5.Fundamentals of Electrical Engineering, Rajendra Prasad, PHI publishers, 2014, Third Edition
6.Fundamentals of Electrical Engineering, Rajendra Prasad, PHI publishers, 2014, Third Edition.

Reference Books:

1.Basic Electrical Engineering, D. P. Kothari and I. J. Nagrath, Mc Graw Hill, 2019,Fourth Edition
2.Principles of Power Systems, V.K. Mehtha, S.Chand Technical Publishers, 2020
3.Circuit Theory, Abhijit Chakrabarti, Dhanpat Rai & Co. Publications, 8th edition, 2023.
4.BasicElectricalEngineering,D.C.Kulshreshtha,TataMcGrawHill, First Edition, 2019
5.Basic Electrical and Electronics Engineering, S. K. Bhatacharya, Person Publications, 2018, Second Edition.

E-Resources:

1.https://nptel.ac.in/courses/108105053
2.https://nptel.ac.in/courses/108108076

DEPARTMENT OF MECHANICAL ENGINEERING

I Year- I Semester	Course Code: BT24ME1101	L	T	P	C
		1	0	4	3
ENGINEERING GRAPHICS *(Common to CE and Mechanical Engineering Branches)*					

Course Objectives:

- To enable the students with various concepts like dimensioning, conventions and standards related to Engineering Drawing
- To impart knowledge on the projection of points, lines and plane surfaces
- To improve the visualization skills for better understanding of projection of solids
- To develop the imaginative skills of the students required to understand Section of solids and Developments of surfaces.
- To make the students understand the viewing perception of a solid object in Isometric and Perspective projections.

Course Outcomes:

CO1: Construct polygons, curves and scales.
CO2: Identify the position of points and lines.
CO3: Analyze the location and position of plane figures
CO4: Analyze the location and position of solids
CO5: Explain principles behind development of surfaces
CO6: Develop an Isometric view and orthographic views.

CO/ PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO 11	PO 12	PS O1	PS O2
CO1	3	2	1	1	-	-	-	-	-	1	-	2	-	-
CO2	3	2	2	1	-	-	-	-	-	1	-	2	-	-
CO3	3	2	3	1	-	-	-	-	-	1	-	2	-	-
CO4	3	2	3	1	-	-	-	-	1	1	-	2	-	-
CO5	3	2	3	1	-	-	-	-	1	1	-	2	-	-
CO6	3	2	3	2	1	-	-	-	3	1	-	2	-	-

UNIT I

Introduction: Lines, Lettering and Dimensioning, Geometrical Constructions and Constructing regular polygons by general methods.
Curves: construction of ellipse, parabola and hyperbola by general, Cycloids, Involutes, Normal and tangent to Curves.
Scales: Plain scales, diagonal scales and Vernier scales.

UNIT II

Orthographic Projections: Reference plane, importance of reference lines or Plane, Projections of a point situated in any one of the four quadrants.
Projections of Straight Lines: Projections of straight lines parallel to both reference planes, perpendicular to one reference plane and parallel to other reference plane, inclined to one reference plane and parallel to the other reference plane. Projections of Straight Line Inclined to both the reference planes

Projections of Planes: regular planes Perpendicular to both reference planes, parallel to one reference plane and inclined to the other reference plane; plane inclined to both the reference planes.

UNIT III

Projections of Solids: Types of solids: Polyhedra and Solids of revolution.

Projections of solids in simple positions: Axis perpendicular to horizontal plane, Axis perpendicular to vertical plane and Axis parallel to both the reference planes, Projection of Solids with axis inclined to one reference plane and parallel to another plane.

UNIT IV

Sections of Solids: Perpendicular and inclined section planes, Sectional views and True shape of section, Sections of solids in simple position only.

Development of Surfaces: Methods of Development: Parallel line development and radial line development. Development of a cube, prism, cylinder, pyramid and cone.

UNIT V

Conversion of Views: Conversion of isometric views to orthographic views; Conversion of orthographic views to isometric views.

Computer graphics: Creating 2D&3D drawings of objects including PCB and Transformations using Auto CAD (Not for end examination).

Textbook:

1. N. D. Bhatt, Engineering Drawing, Charotar Publishing House, 2016.

Reference Books:

1. Engineering Drawing, K.L. Narayana and P. Kannaiah, Tata McGraw Hill, 2013.
2. Engineering Drawing, M.B.Shah and B.C. Rana, Pearson Education Inc,2009.
3. Engineering Drawing with an Introduction to AutoCAD, Dhananjay Jolhe, Tata McGraw Hill, 2017.

DEPARTMENT OF MECHANICAL ENGINEERING

I Year- I Semester	Course Code: BT24ME1102	L	T	P	C
		1	0	4	3
ENGINEERING DRAWING *(Common to EEE, ECE, CSE, CSE aligned branches and IT)*					

Course Objectives:

- To enable the students with various concepts like dimensioning, conventions and standards related to Engineering Drawing
- To impart knowledge on the projection of points, lines and
- To improve the visualization skills for better understanding of projection of plane surfaces
- To improve the visualization skills for better understanding of projection of solids
- To make the students understand the viewing perception of a solid object in Isometric and Perspective projections.

Course Outcomes:

CO1: Construct polygons, curves and scales.
CO2: Identify the position of points and lines.
CO3: Identify the position of lines when inclined to both the planes.
CO4: Analyze the location and position of plane figures.
CO5: Analyze the location and position of solid bodies.
CO6: Develop an Isometric view and orthographic views.

CO/ PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO 12	PS O1	PS O2
CO1	3	2	3	1	-	-	-	-	-	1	-	2	-	-
CO2	3	2	3	1	-	-	-	-	-	1	-	2	-	-
CO3	3	2	3	1	-	-	-	-	-	1	-	2	-	-
CO4	3	2	3	1	1	-	-	-	1	1	-	2	-	-
CO5	3	2	3	1	1	-	-	-	1	1	-	2	-	-
CO6	3	2	3	2	1	-	-	-	3	1	1	2	-	-

UNIT I

Introduction: Lines, Lettering and Dimensioning, Geometrical Constructions and Constructing regular polygons by general methods.
Curves: construction of ellipse, parabola and hyperbola by general, Cycloids, Involutes, Normal and tangent to Curves.
Scales: Plain scales, diagonal scales and Vernier scales.

UNIT II

Orthographic Projections: Reference plane, importance of reference lines or Plane, Projections of a point situated in any one of the four quadrants.
Projections of Straight Lines: Projections of straight lines parallel to both reference planes, perpendicular to one reference plane and parallel to other reference plane, inclined to one reference plane and parallel to the other reference plane. Projections of Straight Line Inclined to both the reference planes

UNIT III

Projections of Planes: regular planes Perpendicular to both reference planes, parallel to one reference plane and inclined to the other reference plane; plane inclined to both the reference planes.

UNIT IV

Projections of Solids: Types of solids: Polyhedra and Solids of revolution.

Projections of solids in simple positions: Axis perpendicular to horizontal plane, Axis perpendicular to vertical plane and Axis parallel to both the reference planes, Projection of Solids with axis inclined to one reference plane and parallel to another plane.

UNIT V

Conversion of Views: Conversion of isometric views to orthographic views; Conversion of orthographic views to isometric views.

Computer graphics: Creating 2D&3D drawings of objects including PCB and Transformations using Auto CAD (Not for end examination).

Textbook:

1. N. D. Bhatt, Engineering Drawing, Charotar Publishing House, 2016.

Reference Books:

1. Engineering Drawing, K.L. Narayana and P. Kannaiah, Tata McGraw Hill, 2013.
2. Engineering Drawing, M.B.Shah and B.C. Rana, Pearson Education Inc,2009.
3. Engineering Drawing with an Introduction to AutoCAD, Dhananjay Jolhe, Tata McGraw Hill, 2017.

DEPARTMENT OF COMPUTER SCIENCE ENGINEERING

I Year- I Semester	Course Code: BT24CS1102	L	T	P	C
		0	0	2	1
IT WORKSHOP *(Common to all branches of Engineering)*					

Course Objectives:

- To introduce the internal parts of a computer, peripherals, I/O ports, connecting cables
- To demonstrate configuring the system as Dual boot both Windows and other Operating Systems Viz. Linux, BOSS
- To teach basic command line interface commands on Linux.
- To teach the usage of Internet for productivity and self-paced life-long learning
- To introduce Compression, Multimedia and Antivirus tools and Office Tools such as Word processors, Spread sheets and Presentation tools.

Course Outcomes:

CO1: Apply knowledge for computer assembling and software installation and solve trouble shooting problems
CO2: Understand hardware components and inter dependencies
CO3: Evaluate the cyber hygiene that is protecting the personal computer from getting infected with the viruses, worms and other cyber-attacks
CO4: Use various Microsoft tools like professional word documents and presentations
CO5: Calculate various excel spreadsheets
CO6: Build various AI Tools – Chartgpt

CO/ PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO 12	PS O1	PS O2
CO1	2	3	2	2	2	-	-	-	-	-	-	-	-	2
CO2	2	3	3	3	-	-	-	-	-	-	-	-	-	-
CO3	2	3	3	2	3	-	-	-	-	-	-	-	-	-
CO4	2	3	3	3	2	-	-	-	-	-	-	-	2	-
CO5	2	3	3	2	2	-	-	-	-	-	-	-	2	-
CO6	3	2	3	2	2	-	-	-	-	-	-	-	-	-

PC Hardware & Software Installation

Task 1: Identify the peripherals of a computer, components in a CPU and its functions. Draw the block diagram of the CPU along with the configuration of each peripheral and submit to your instructor.

Task 2: Every student should disassemble and assemble the PC back to working condition. Lab instructors should verify the work and follow it up with a Viva. Also students need to go through the video which shows the process of assembling a PC. A video would be given as part of the course content.

Task 3: Every student should individually install MS windows on the personal computer. Lab instructor should verify the installation and follow it up with a Viva.
Task 4: Every student should install Linux on the computer. This computer should have windows installed. The system should be configured as dual boot (VMWare) with both Windows and Linux. Lab instructors should verify the installation and follow it up with a Viva

Task 5: Every student should install BOSS on the computer. The system should be configured as dual boot (VMWare) with both Windows and BOSS. Lab instructors should verify the installation and follow it up with a Viva

Internet & World Wide Web

Task1: Orientation & Connectivity Boot Camp: Students should get connected to their Local Area Network and access the Internet. In the process they configure the TCP/IP setting. Finally students should demonstrate, to the instructor, how to access the websites and email. If there is no internet connectivity preparations need to be made by the instructors to simulate the WWW on the LAN.

Task 2: Web Browsers, Surfing the Web: Students customize their web browsers with the LAN proxy settings, bookmarks, search toolbars and pop up blockers. Also, plug-ins like Macromedia Flash and JRE for applets should be configured.

Task 3: Search Engines & Netiquette: Students should know what search engines are and how to use the search engines. A few topics would be given to the students for which they need to search on Google. This should be demonstrated to the instructors by the student.

Task 4: Cyber Hygiene: Students would be exposed to the various threats on the internet and would be asked to configure their computer to be safe on the internet. They need to customize their browsers to block pop ups, block active x downloads to avoid viruses and/or worms.

LaTeX and WORD

Task 1 – Word Orientation: The mentor needs to give an overview of La TeX and Microsoft (MS) office or equivalent (FOSS) tool word: Importance of La TeX and MS office or equivalent (FOSS) tool Word as word Processors, Details of the four tasks and features that would be covered in each, Using La TeXand word – Accessing, overview of toolbars, saving files, Using help and resources, rulers, format painter in word.

Task 2: Using La TeX and Word to create a project certificate. Features to be covered:- Formatting Fonts in word, Drop Cap in word, Applying Text effects, Using Character Spacing, Borders and Colors, Inserting Header and Footer, Using Date and Time option in both La TeX and Word.

Task 3: Creating project abstract Features to be covered:-Formatting Styles, Inserting table, Bullets and Numbering, Changing Text Direction, Cell alignment, Footnote, Hyperlink, Symbols, Spell Check, Track Changes.

Task 4: Creating a Newsletter: Features to be covered:- Table of Content, Newspaper columns, Images from files and clipart, Drawing toolbar and Word Art, Formatting Images, Textboxes, Paragraphs and Mail Merge in word.

EXCEL

Excel Orientation: The mentor needs to tell the importance of MS office or equivalent (FOSS) tool Excel as a Spreadsheet tool, give the details of the four tasks and features that would be covered in each. Using Excel – Accessing, overview of toolbars, saving excel files, Using help and resources.

Task 1: Creating a Scheduler - Features to be covered: Gridlines, Format Cells, Summation, auto fill, Formatting Text

Task 2: Calculating GPA -. Features to be covered:- Cell Referencing, Formulae in excel – average, std. deviation, Charts, Renaming and Inserting worksheets, Hyper linking, Count function,

LOOKUP/VLOOKUP

Task 3: Split cells, freeze panes, group and outline, Sorting, Boolean and logical operators, Conditional formatting

POWER POINT

Task 1: Students will be working on basic power point utilities and tools which help them create basic power point presentations. PPT Orientation, Slide Layouts, Inserting Text, Word Art, Formatting Text, Bullets and Numbering, Auto Shapes, Lines and Arrows in PowerPoint.

Task 2: Interactive presentations - Hyperlinks, Inserting –Images, Clip Art, Audio, Video, Objects, Tables and Charts.

Task 3: Master Layouts (slide, template, and notes), Types of views (basic, presentation, slide slotter, notes etc), and Inserting – Background, textures, Design Templates, Hidden slides.

AI TOOLS – ChatGPT

Task 1: Prompt Engineering: Experiment with different types of prompts to see how the model responds. Try asking questions, starting conversations, or even providing incomplete sentences to see how the model completes them.

• Ex: Prompt: "You are a knowledgeable AI. Please answer the following question: What is the capital of France?"

Task 2: Creative Writing: Use the model as a writing assistant. Provide the beginning of a story or a description of a scene, and let the model generate the rest of the content. This can be a fun way to brainstorm creative ideas

• Ex: Prompt: "In a world where gravity suddenly stopped working, people started floating upwards. Write a story about how society adapted to this new reality."

Task 3: Language Translation: Experiment with translation tasks by providing a sentence in one language and asking the model to translate it into another language. Compare the output to see how accurate and fluent the translations are.

• Ex:Prompt: "Translate the following English sentence to French: 'Hello, how are you doing today?'"

Reference Books:

1. Comdex Information Technology course tool kit, Vikas Gupta, WILEY Dream tech, 2003
2. The Complete Computer upgrade and repair book, Cheryl A Schmidt, WILEY Dream tech, 2013, 3rd edition
3. Introduction to Information Technology, ITL Education Solutions limited, Pearson Education, 2012, 2nd edition
4. PC Hardware - A Handbook, Kate J. Chase, PHI (Microsoft)
5. LaTeX Companion, Leslie Lamport, PHI/Pearson.
6. IT Essentials PC Hardware and Software Companion Guide, David Anfins on and Ken Quamme. – CISCO Press, Pearson Education, 3rd edition
7. IT Essentials PC Hardware and Software Labs and Study Guide, Patrick Regan– CISCO Press, Pearson Education, 3rd edition

DEPARTMENT OF BASIC SCIENCE AND HUMANITIES

I Year- I Semester	Course Code: BT24BS1107	L	T	P	C
		0	0	2	1
ENGINEERING PHYSICS LAB *(Common to All Branches of Engineering)*					

Course Objectives:
To study the concepts of optical phenomenon like interference, diffraction etc., recognize the importance of energy gap in the study of conductivity and Hall effect in semiconductors and study the parameters and applications of dielectric and magnetic materials by conducting experiments.

Course Outcomes: The students will be able to
CO1: Operate optical instruments like travelling microscope and spectrometer.
CO2: Estimate the wavelengths of different colours using diffraction grating.
CO3: Plot the intensity of the magnetic field of circular coil carrying current with distance.
CO4:Evaluate dielectric constant and magnetic susceptibility for dielectric and magnetic materials respectively.
CO5: Calculate the band gap of a given semiconductor.
CO6: Identify the type of semiconductor using Hall effect.

CO/ PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO 12	PS O1	PS O2
CO 1	3	2	-	-	-	-	-	-	1	-	-	1	-	-
CO 2	3	2	-	-	-	-	-	-	1	-	-	1	-	-
CO 3	3	2	-	-	-	-	-	-	1	-	-	1	-	-
CO 4	3	2	-	-	-	-	-	-	1	-	-	1	-	-
CO 5	3	2	-	-	-	-	-	-	1	-	-	1	-	-
CO 6	3	2	-	-	-	-	-	-	1	-	-	1	-	-

List of Experiments:
1. Determination of radius of curvature of a given Plano-convex lens by Newton's rings.
2. Determination of wavelengths of different spectral lines in mercury spectrum using diffraction grating in normal incidence configuration.
3. Verification of Brewster's law
4. Determination of dielectric constant using charging and discharging method.
5. Study the variation of B versus H by magnetizing the magnetic material (B-H curve).
6. Determination of wavelength of Laser light using diffraction grating.
7. Estimation of Planck's constant using photoelectric effect.
8. Determination of the resistivity of semiconductors by four probe methods.
9. Determination of energy gap of a semiconductor using p-n junction diode.
10. Magnetic field along the axis of a current carrying circular coil by Stewart Gee's Method.
11. Determination of Hall voltage and Hall coefficient of a given semiconductor using Hall effect.
12. Determination of temperature coefficients of a thermistor.
13. Determination of acceleration due to gravity and radius of Gyration by using a compound pendulum.
14. Determination of magnetic susceptibility by Kundt's tube method.
15. Determination of rigidity modulus of the material of the given wire using Torsional pendulum.

16. Sonometer: Verification of laws of stretched string.
17. Determination of young's modulus for the given material of wooden scale by Non uniform bending (or double cantilever) method.
18. Determination of Frequency of electrically maintained tuning fork by Melde's experiment.

Note: Any TEN of the listed experiments are to be conducted. Out of which any TWO experiments may be conducted in virtual mode.

References:

1. A Textbook of Practical Physics - S. Balasubramanian, M.N. Srinivasan,S. Chand Publishers, 2017.

Online learning resources :

1. www.vlab.co.in

DEPARTMENT OF ELECTRICAL ELECTRONICS ENGINEERING

I Year- I Semester	Course Code: BT24EE1102	L	T	P	C
		0	0	3	1.5

ELECTRICAL & ELECTRONICS ENGINEERING WORKSHOP
(Common to All branches of Engineering)

Course Objectives: Students will learn

- To verify Kirchhoff's laws.
- To measure various electrical quantities using different types of meters.
- About safety measures used in electrical systems.

Course Outcomes: At the end of the course, the student will be able to
CO1: Study and identification of various electrical circuit components and also measure voltage, current and power electrical circuits.
CO2: Choose and assemble various wiring schemes.
CO3: Solve electrical energy and measure earth resistance for domestic premises.

Mapping of Course Outcomes with Program Outcomes and Program Specific Outcomes:

CO/ PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO 11	PO 12	PSO 1	PSO 2
CO1	3	2	2	-	-	2	2	-	2	1	-	1	2	-
CO2	3	1	-	1	-	-	-	-	2	2	-	1	2	-
CO3	3	2	2	2	2	1	-	-	2	1	-	2	2	2

Part-A BASIC ELECTRICAL ENGINEERING LAB

List of Experiments:

1. Identification of various types of resistors and capacitors and understand the usage of digital multi-meter
2. Study various types of electrical cables/wires, switches, fuses, fuse carriers, MCB, ELCB, RCCB, and MCCB with their specifications and usage.
3. Measurement of Voltage, Current and Power in a DC Circuit
4. Verification of KCL and KVL
5. Measurement of Earth Resistance using Megger
6. Calculation of Electrical Energy for Domestic Premises
7. Staircase wiring scheme
8. Godown wiring scheme

Note: A minimum of six experiments are to be performed.

Reference Books:

1. Engineering Circuits Analysis, Jack Kemmerly,WilliamHayt and Steven Durbin, Tata McGraw Hill Education,2020, 9thedition.
2. Power System Engineering, P.V. Gupta, M.L. Soni, U.S. Bhatnagar and A. Chakrabarti, Dhanpat Rai & Co, 2013
3. Fundamentals of Electrical Engineering, Rajendra Prasad, PHI publishers, 2014, Third Edition
4. Basic Electrical Engineering, D. C. Kulshreshtha, Tata McGraw Hill, 2019, First Edition.

PART B: ELECTRONICS ENGINEERING LAB

Course Objectives: To impart knowledge on the principles of digital electronics and fundamentals of electron devices & its applications.

Course Outcomes: At the end of the course, the student will be able to

CO4: Identify the various electronic components andunderstand the working of components.
CO5: Plot and discuss the characteristics of various electron devices.
CO6: Explain the operation of a digital circuit.

Mapping of Course Outcomes with Program Outcomes and Program Specific Outcomes:

CO/ PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO 8	PO 9	PO 10	PO 11	PO 12	PS O1	PS O2
CO4	3	2	2	-	-	-	-	-	-	1	-	3	2	-
CO5	3	2	2	-	-	-	-	-	-	1	-	3	2	-
CO6	3	2	2	-	-	-	-	-	-	1	-	3	2	-

List of Experiments

1. Plot V-I characteristics of PN Junction diode A) Forward bias B) Reverse bias.
2. Plot V – I characteristics of Zener Diode and its application as voltage Regulator.
3. Implementation of half wave and full wave rectifiers
4. Plot Input & Output characteristics of BJT in CE and CB configurations
5. Frequency response of CE amplifier.
6. Simulation of RC coupled amplifier with the design supplied
7. Verification of Truth Table of AND, OR, NOT, NAND, NOR, Ex-OR, Ex-NOR gates using ICs.
8. Verification of Truth Tables of S-R, J-K& D flip flops using respective ICs.

Tools / Equipment Required: DC Power supplies, Multi meters, DC Ammeters, DC Voltmeters, AC Voltmeters, CROs, all the required active devices.

Reference Books:

1. R. L. Boylestad& Louis Nashlesky, Electronic Devices & Circuit Theory, Pearson Education, 2021.
2. R. P. Jain, Modern Digital Electronics, 4th Edition, Tata Mc Graw Hill, 2009
3. R. T. Paynter, Introductory Electronic Devices & Circuits – Conventional Flow Version, Pearson Education,2009.

DEPARTMENT OF BASIC SCIENCE AND HUMANITIES

I Year- I Semester	Course Code: BT24BS1109	L	T	P	C
		0	0	1	0.5
NSS and COMMUNITY SERVICE *(Common to All branches of Engineering)*					

Course Objectives:
The objective of introducing this course is to impart discipline, character, fraternity, teamwork, social consciousness among the students and engaging them in selfless service.

Course Outcomes: After completion of the course the students will be able to
CO1: Understand the importance of discipline, character and service motto
CO2: Solve some societal issues by applying acquired knowledge, facts, and techniques.
CO3: Explore human relationships by analyzing social problems
CO4: Determine to extend their help for the fellow beings and downtrodden people.
CO5: Develop leadership skills and civic responsibilities.
CO6: Participate in activities related to health, hygiene, environment, literacy, disaster management, and gender equity with empathy and commitment.

CO/ PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO 9	PO10	PO11	PO12	PS O1	PS O2
CO1	-	-	-	-	-	-	-	3	-	2	-	3	-	-
CO2	-	-	-	-	-	3	-	1	-	2	-	2	-	-
CO3	-	-	-	-	-	-	-	3	-	2	-	2	-	-
CO4	-	-	-	-	-	-	-	2	-	2	-	2	-	-
CO5	-	-	-	-	-	1	3	2	-	2	-	2	-	-
CO6	-	-	-	-	-	2	1	2		2		2	-	-

UNIT I
Orientation
General Orientation on NSS/NCC/ Scouts & Guides/Community Service activities, career guidance.
Activities:

i. Conducting –ice breaking sessions-expectations from the course-knowing personal talents and skills
ii. Conducting orientations programs for the students –future plans-activities-releasing road map etc.
iii. Displaying success stories-motivational biopics- award winning movies on societal issues etc.
iv. Conducting talent show in singing patriotic songs-paintings- any other contribution.

UNIT II
Nature & Care
Activities:

i. Best out of waste competition.
ii. Poster and signs making competition to spread environmental awareness.
iii. Recycling and environmental pollution article writing competition.
iv. Organizing Zero-waste day.
v. Digital Environmental awareness activity via various social media platforms.

vi. Virtual demonstration of different eco-friendly approaches for sustainable living.
vii. Write a summary on any book related to environmental issues.

UNIT III
Community Service
Activities:

i. Conducting One Day Special Camp in a village contacting village-area leaders- Survey in the village, identification of problems- helping them to solve via media- authoritiesexperts-etc.
ii. Conducting awareness programs on Health-related issues such as General Health, Mental health, Spiritual Health, HIV/AIDS,
iii. Conducting consumer Awareness. Explaining various legal provisions etc.
iv. Women Empowerment Programmes- Sexual Abuse, Adolescent Health and Population Education.
v. Any other programmes in collaboration with local charities, NGOs etc.

Reference Books:

1. Nirmalya Kumar Sinha & Surajit Majumder, A Text Book of National Service Scheme Vol;.I, Vidya Kutir Publication, 2021 (ISBN 978-81-952368-8-6)
2. Red Book - National Cadet Corps – Standing Instructions Vol I & II, Directorate General of NCC, Ministry of Defence, New Delhi
3. Davis M. L. and Cornwell D. A., "Introduction to Environmental Engineering", McGraw Hill, New York 4/e 2008
4. Masters G. M., Joseph K. and Nagendran R. "Introduction to Environmental Engineering and Science", Pearson Education, New Delhi. 2/e 2007
5. Ram Ahuja. Social Problems in India, Rawat Publications, New Delhi.

General Guidelines:

1. Institutes must assign slots in the Timetable for the activities.
2. Institutes are required to provide instructor to mentor the students.

Evaluation Guidelines:

1. Evaluated for a total of 100 marks.
2. A student can select 6 activities of his/her choice with a minimum of 01 activity per unit.
3. Each activity shall be evaluated by the concerned teacher for 15 marks, totalling to 90 marks.

A student shall be evaluated by the concerned teacher for 10 marks by conducting viva voce on the subject

DR24

ENGINEERING CURRICULUM

W.e.f. 2024-25

I YEAR - II SEMESTER

B.Tech. (Regular-Full time)

(Effective for the students admitted into I year from
The Academic Year **2024-25** onwards)

DEPARTMENT OF BASIC SCIENCE AND HUMANITIES

B.Tech. I Year II Semester (for Group –A Branches - CSE, AID, CSM)

S.No.	Category	Subject Code	Title	L/D	T	P	Credits
1	BS&H	BT24BS1205	Engineering Physics	3	0	0	3
2	BS&H	BT24BS1204	Differential Equations & Vector Calculus	3	0	0	3
3	BS&H	BT24EE1201	Basic Electrical and Electronics Engineering	3	0	0	3
4	Engineering Science	BT24ME1201	Engineering Drawing	1	0	4	3
5	Engineering Science	BT24CS1202	IT Workshop	0	0	2	1
6	BS&H	BT24CS1201	Data Structures (Branch specific)	3	0	0	3
7	BS&H	BT24BS1209	Engineering Physics Lab	0	0	2	1
8	Engineering Science	BT24EE1204	Electrical and Electronics Engineering Workshop	0	0	3	1.5
9	Engineering Science	BT24CS1203	Data Structures Lab	0	0	3	1.5
10	BS&H	BT24BS1211	NSS & Community Service	-	-	1	0.5
Total				**13**	**00**	**15**	**20.5**

B.Tech. I Year II Semester (for Group -B Branches - CE, EEE, ME, ECE & IT)

S.No.	Category	Subject Code	Title	L/D	T	P	Credits
1	BS&H	BT24BS1201	Communicative English	2	0	0	2
2	BS& H	BT24BS1203/ BT24BS1202	Engineering Chemistry / Chemistry	3	0	0	3
3	BS& H	BT24BS1204	Differential Equations & Vector Calculus	3	0	0	3
4	Engineering Science	BT24CE1201	Basic Civil & Mechanical Engineering	3	0	0	3
5	Professional Core	BT24ME1202/ BT24EE1203/ BT24CS1201/ BT24EE1202	Engineering Mechanics / Network Analysis / Data structures / Electrical Circuit Analysis – I (Branch specific)	3	0	0	3
6	BS&H	BT24BS1206	Communicative English Lab	0	0	2	1
7	BS&H	BT24BS1208/ BT24BS1207	Engineering Chemistry Lab/ Chemistry Lab	0	0	2	1
8	Engineering Science	BT24ME1203	Engineering Workshop	0	0	3	1.5
9	Professional Core	BT24CE1202/ BT24ME1204/ BT24EE1206/ BT24CS1202/ BT24EE1205	Engineering Mechanics & Building Practices Lab/ Engineering Mechanics Lab / Network Analysis and Simulation Lab / Data structures Lab/ Electrical Circuits Lab	0	0	3	1.5
10	BS& H	BT24BS1210	Health and wellness, Yoga and Sports	-	-	1	0.5
Total				**14**	**00**	**11**	**19.5**

DEPARTMENT OF BASIC SCIENCE AND HUMANITIES

I Year- II Semester	Course Code: BT24BS1205	L	T	P	C
		3	0	0	3
ENGINEERING PHYSICS *(Common for all branches of Engineering)*					

Course Objectives: To bridge the gap between the Physics in school at 10+2 level and UG level engineering courses by identifying the importance of the optical phenomenon like interference, diffraction etc, enlightening the periodic arrangement of atoms in crystalline solids and concepts of quantum mechanics, introduce novel concepts of dielectric and magnetic materials, physics of semiconductors.

Course Outcomes:
CO1: Analyze the intensity variation of light due to polarization, interference and diffraction.
CO2: Examine the crystal structures with the basics of crystals.
CO3: Summarize various types of polarization of dielectrics and classify the magnetic materials.
CO4: Using fundamentals of quantum mechanics solve the one dimensional motion of particles.
CO5: Apply the basic concepts of quantum free electron theory to Fermi energy and classification of crystalline solids.
CO6: Identify the type of semiconductor using Hall effect.

CO/ PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO 10	PO 11	PO 12	PS O1	PS O2
CO1	3	2	2	1	-	-	-	-	-	-	-	1	-	-
CO2	3	2	2	1	-	-	-	-	-	-	-	1	-	-
CO3	3	2	2	-	-	-	-	-	-	-	-	1	-	-
CO4	3	2	2	-	-	-	-	-	-	-	-	1	-	-
CO5	3	2	2	-	-	-	-	-	-	-	-	1	-	-
CO6	3	2	2	-	-	-	-	-	-	-	-	1	-	-

UNIT I Wave Optics 12hr

Interference: Introduction - Principle of superposition –Interference of light - Interference in thin films (Reflection Geometry) & applications - Colours in thin films- Newton's Rings, Determination of wavelength and refractive index.

Diffraction: Introduction - Fresnel and Fraunhofer diffractions - Fraunhofer diffraction due to single slit, double slit & N-slits (Qualitative) – Diffraction Grating - Dispersive power and resolving power of Grating (Qualitative).

Polarization: Introduction -Types of polarization - Polarization by reflection, refraction and Double refraction - Nicol's Prism -Half wave and Quarter wave plates.

UNIT II Crystallography and X-ray diffraction 10hr

Crystallography: Space lattice, Basis, Unit Cell and lattice parameters – Bravais Lattices – crystal systems (3D) – coordination number - packing fraction of SC, BCC & FCC - Miller indices – separation between successive (hkl) planes.

X-ray diffraction: Bragg's law - X-ray Diffractometer – crystal structure determination by Laue's and powder methods

UNIT III Dielectric and Magnetic Materials 8hr

Dielectric Materials: Introduction - Dielectric polarization - Dielectric polarizability, Susceptibility, Dielectric constant and Displacement Vector – Relation between the electric vectors - Types of polarizations- Electronic (Quantitative), Ionic (Quantitative) and Orientation polarizations (Qualitative) - Lorentz internal field - Clausius- Mossotti equation.

Magnetic Materials: Introduction - Magnetic dipole moment - Magnetization-Magnetic susceptibility and permeability – Atomic origin of magnetism - Classification of magnetic materials: Dia, para, Ferro, anti-ferro & Ferri magnetic materials - Domain concept for Ferromagnetism & Domain walls (Qualitative) - Hysteresis - soft and hard magnetic materials.

UNIT IV Quantum Mechanics and Free electron Theory 10hr

Quantum Mechanics: Dual nature of matter – Heisenberg's Uncertainty Principle – Significance and properties of wave function – Schrodinger's time independent and dependent wave equations– Particle in a one-dimensional infinite potential well.

Free Electron Theory: Classical free electron theory (Qualitative with discussion of merits and demerits) – Quantum free electron theory – electrical conductivity based on quantum free electron theory - Fermi-Dirac distribution - Density of states - Fermi energy

UNIT V Semiconductors 8hr

Semiconductors: Formation of energy bands – classification of crystalline solids - Intrinsic semiconductors: Density of charge carriers – Electrical conductivity – Fermi level – Extrinsic semiconductors: density of charge carriers – dependence of Fermi energy on carrier concentration and temperature - Drift and diffusion currents – Einstein's equation – Hall effect and its applications.

Textbooks:

1. Engineering Physics, Dr.D. Tirupathi Naidu and M. Veeranjaneyulu, VGS Publications, 2023.
2. A Text book of Engineering Physics, M. N. Avadhanulu, P.G.Kshirsagar & TVS Arun Murthy, S.Chand Publications, 11th Edition 2019.
3. Engineering Physics - D.K.Bhattacharya and Poonam Tandon, Oxford press (2015)

Reference Books:

1. Engineering Physics - B.K. Pandey and S. Chaturvedi, Cengage Learning 2021.
2. Engineering Physics - Shatendra Sharma, Jyotsna Sharma, Pearson Education, 2018.
3. Engineering Physics - Sanjay D. Jain, D. Sahasrabudhe and Girish, University Press. 2010
4. Engineering Physics - M.R. Srinivasan, New Age international publishers (2009).

Online learning resources :

https://dnrcet.org/web/departments/hs/courses/b-tech/syllabus/

DEPARTMENT OF BASIC SCIENCE AND HUMANITIES

I Year- II Semester	Course Code: BT24BS1204	L	T	P	C
		3	0	0	3
DIFFERENTIAL EQUATIONS AND VECTOR CALCULUS *(Common to All Branches of Engineering)*					

Course Objectives:

- To enlighten the learners in the concept of differential equations and multivariable calculus.
- To furnish the learners with basic concepts and techniques at plus two level to lead them into advanced level by handling various real-world applications.

Course Outcomes: At the end of the course, the student will be able to

CO1: Solve first-order linear differential equations
CO2: Understand homogeneous and non-homogeneous linear differential equations
CO3: Understand the basic concepts of partial differential equations (PDEs)
CO4: Solve first-order linear partial differential equations using **Lagrange's method.**
CO5: Apply the **Del operator** to scalar point functions to compute **gradients** and **directional derivatives**
CO6: Evaluate **volume integrals** and apply the **Divergence Theorem** (with proof) to relate surface and volume integrals in vector fields

CO/PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO 10	PO 11	PO 12	PS O1	PS O2
CO1	3	3	-	-	-	-	-	-	-	-	-	-	-	-
CO2	3	3	-	-	-	-	-	-	-	-	-	-	-	-
CO3	3	3	-	-	-	-	-	-	-	-	-	-	-	-
CO4	3	3	-	-	-	-	-	-	-	-	-	-	-	-
CO5	3	2	-	-	-	-	-	-	-	-	-	-	-	-
CO6	3	3	-	-	-	-	-	-	-	-	-	-	-	-

UNIT-I Differential equations of first order and first degree 10 hr

Linear differential equations –Bernoulli's equations-Exact equations and equations reducible to exact form. Applications: Newton's Law of cooling – Law of natural growth and decay- Electrical circuits.

UNIT-II Linear differential equations of higher order(Constant Coefficients) 10 hr

Definitions, homogenous and non-homogenous, complimentary function, general solution, particular integral, Wronskian, Method of variation of parameters. Simultaneous linear equations, Applications to L-C-R Circuit problems and Simple Harmonic motion.

UNIT-III Partial Differential Equations 10 hr

Introduction and formation of Partial Differential Equations by elimination of arbitrary constants and arbitrary functions, solutions of first order linear equations using Lagrange's method. Homogeneous Linear Partial differential equations with constant coefficients.

UNIT-IV Vector differentiation 8 hr

Scalar and vector point functions, vector operator Del, Del applies to scalar point functions-Gradient, Directional derivative, del applied to vector point functions-Divergence and Curl, vector identities.

UNIT-V Vector integration 10 hr

LWithoutegral-circulation-work done, surface integral-flux, Green's theorem in the plane (without proof), Stoke's theorem (without proof), volume integral, Divergence theorem (without proof) and related problems.

Textbooks:

1.Higher Engineering Mathematics,B.S.Grewal,KhannaPublishers,2017,44th Edition
2.Advanced Engineering Mathematics, Erwin Kreyszig, John Wiley & Sons, 2018, 10th Edition.

Reference Books:

1.Thomas Calculus, George B.Thomas, MauriceD.Weir and JoelHass, Pearson Publishers, 2018, 14th Edition.
2.Advanced Engineering Mathematics, Dennis G. Zill and Warren S. Wright, Jones and Bartlett, 2018.
3.Advanced Modern Engineering Mathematics, Glyn James, Pearson publishers, 2018, 5th Edition.
4.Advanced Engineering Mathematics, R. K. Jain and S. R. K. Iyengar, Alpha Science International Ltd., 2021 5th Edition (9th reprint).
5.Higher Engineering Mathematics, B.V.Ramana, Mc Graw Hill Education,2017

DEPARTMENT OF ELECTRICAL & ELECTRONICS ENGINEERING

I Year- II Semester	Course Code: BT24EE1201	L	T	P	C
		3	0	0	3

BASIC ELECTRICAL & ELECTRONICS ENGINEERING
(Common to All branches of Engineering)

Course Objectives: Students will learn

- About the basic principles of Direct Current (DC) & Alternating Current (AC) Circuit analysis
- About the fundamentals of magnetic circuits analysis.
- About Electrical Wiring and Electrical Safety.

Course Outcomes: At the end of the course, the student will be able to
CO1: Apply the circuit laws for the analysis of simple DC and AC circuits.
CO2: Apply the basic principles for solving fundamental magnetic circuits**.**
CO3: Apply the basic principles of electrical wiring and electric safety measures**.**

Mapping of Course Outcomes with Program Outcomes and Program Specific Outcomes:

CO/ PO	PO1	PO2	PO3	PO4	PO 5	PO6	PO7	PO8	PO9	PO10	PO11	PO 12	PS O1	PS O2
CO1	3	3	3	2	-	1	-	-	3	3	3	1	1	2
CO2	3	3	2	2	-	2	-	-	2	3	3	1	1	1
CO3	3	2	2	1	-	3	-	-	2	3	3	1	1	2

PART A: BASIC ELECTRICAL ENGINEERING

UNIT I INTRODUCTION TO ELECTRICAL CIRCUITS

Basic Concepts of passive elements of R, L, C and their V-I relations, Sources (dependent and independent), Kirchhoff's laws, Network reduction techniques (series, parallel, series - parallel, star-to-delta and delta-to-star transformation), source transformation technique, nodal analysis and mesh analysis to DC networks with dependent and independent voltage and current sources.

UNIT II MAGNETIC CIRCUITS

Basic definition of MMF, flux and reluctance, analogy between electrical and magnetic circuits, Faraday's laws of electromagnetic induction – concept of self and mutual inductance, Dot convention – coefficient of coupling and composite magnetic circuit, analysis of series and parallel magnetic circuits.

UNIT III ELECTRICAL WIRING, ELECTRICITY BILL & SAFETY MEASURES

Electrical Wiring: SimpleLamp circuits, stair case wiring scheme, godown wiring scheme, types of service mains, types of electrical wiring, cost estimation of indoor wiring, wiring layout of workshop/ electrical laboratory.

Electricity bill: Power rating of household appliances including air conditioners, PCs, Laptops, Printersetc., Types of electricity tariff, calculation of electricity bill for domestic consumers.

Equipment Safety Measures: Working principle of Fuse and Miniature circuit breaker (MCB), merits and demerits. Personal safety measures: Electric Shock, Earthing and its types, SafetyPrecautions to avoid shock

PART B: BASIC ELECTRONICS ENGINEERING

Course Objectives: Students will learn

- To teach the fundamentals of semiconductor devices and its applications, principles of digital electronics.

Course Outcomes: At the end of the course, the student will be able to
CO4: Analyze various characteristics of semiconductor devices.
CO5: Apply the basic principles for understanding and working of rectifiers and power Supplies.
CO6: Explain the working of various logic gates**.**
Mapping of Course Outcomes with Program Outcomes and Program Specific Outcomes:

CO/ PO	PO1	PO2	PO3	PO4	PO 5	PO6	PO7	PO8	PO9	PO10	PO11	PO 12	PS O1	PS O2
CO4	2	1	2	1	-	1	-	-	-	-	1	3	2	-
CO5	3	1	2	1	-	1	-	-	-	-	1	3	2	-
CO6	2	2	2	1	-	1	-	-	-	-	1	3	2	-

UNIT I: **SEMICONDUCTOR DEVICES**
Introduction - Evolution of electronics – Vacuum tubes to nano electronics - Characteristics of PN Junction Diode — Zener Effect — Zener Diode and its Characteristics. Bipolar Junction Transistor — CB, CE, CC Configurations and Characteristics — Elementary Treatment of Small Signal CE Amplifier

UNIT II: **BASIC ELECTRONIC CIRCUITS AND INSTRUMENTTAION**
Rectifiers and power supplies: Block diagram description of a dc power supply, working of a full wave bridge rectifier, capacitor filter (no analysis), working of simple Zener voltage regulator. Amplifiers: Block diagram of Public Address system, Circuit diagram and working of common emitter (RC coupled) amplifier with its frequency response. Electronic Instrumentation: Block diagram of an electronic instrumentation system.

UNIT III : DIGITAL ELECTRONICS
Overview of Number Systems, Logic gates including Universal Gates, BCD codes, Excess-3 code, Gray code, Hamming code. Boolean Algebra, Basic Theorems and properties of Boolean Algebra, Truth Tables and Functionality of Logic Gates – NOT, OR, AND, NOR, NAND, XOR and XNOR. Simple combinational circuits–Half and Full Adders. Introduction to sequential circuits, Flip flops, Registers and counters (Elementary Treatment only)

Textbooks:

1. Principles of Electrical and Electronics Engineering, V.K. Mehtha, S. Chand Technical Publishers
2. Basic Electrical Engineering, Ritu SahDev, Khanna Publishers, 2018, First Edition.
3. FundamentalsofElectricalCircuits,CharlesK.AlexanderandMathewN.O.Sadiku,McGrawHill Education (India),2013,Fifth Edition
4. Electrical Wiring Estimating and Costing –Dr. S. L. Uppal-Khanna Publishers-198
5. Fundamentals of Electrical Engineering, Rajendra Prasad, PHI publishers, 2014, Third Edition
6. Fundamentals of Electrical Engineering, Rajendra Prasad, PHI publishers, 2014, Third Edition.

Reference Books:

1. Basic Electrical Engineering, D. P. Kothari and I. J. Nagrath, Mc Graw Hill, 2019,Fourth Edition
2. Principles of Power Systems, V.K. Mehtha, S.Chand Technical Publishers, 2020
3. Circuit Theory, Abhijit Chakrabarti, Dhanpat Rai & Co. Publications, 8th edition, 2023.
4. BasicElectricalEngineering,D.C.Kulshreshtha,TataMcGrawHill, First Edition, 2019
5. Basic Electrical and Electronics Engineering, S. K. Bhatacharya, Person Publications, 2018, Second Edition.

E-Resources:

1. https://nptel.ac.in/courses/108105053
2. https://nptel.ac.in/courses/108108076

DEPARTMENT OF MECHANICAL ENEGINEERING

I Year- II Semester	Course Code: BT24ME1201	L	T	P	C
		1	0	4	3
ENGINEERING DRAWING *(Common to EEE, ECE, CSE, CSE aligned branches and IT)*					

Course Objectives:

- To enable the students with various concepts like dimensioning, conventions and standards related to Engineering Drawing
- To impart knowledge on the projection of points, lines and
- To improve the visualization skills for better understanding of projection of plane surfaces
- To improve the visualization skills for better understanding of projection of solids
- To make the students understand the viewing perception of a solid object in Isometric and Perspective projections.

Course Outcomes:

CO1: Construct polygons, curves and scales.
CO2: Identify the position of points and lines.
CO3: Identify the position of lines when inclined to both the planes.
CO4: Analyze the location and position of plane figures**.**
CO5: Analyze the location and position of solid bodies.
CO6 : Develop an Isometric view and orthographic views

CO/ PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO 11	PO 12	PS O1	PS O2
CO1	3	2	3	1	-	-	-	-	-	1	-	2	-	-
CO2	3	2	3	1	-	-	-	-	-	1	-	2	-	-
CO3	3	2	3	1	-	-	-	-	-	1	-	2	-	-
CO4	3	2	3	1	1	-	-	-	1	1	-	2	-	-
CO5	3	2	3	1	1	-	-	-	1	1	-	2	-	-
CO6	3	2	3	2	1	-	-	-	3	1	1	2	-	-

UNIT I

Introduction: Lines, Lettering and Dimensioning, Geometrical Constructions and Constructing regular polygons by general methods.
Curves: construction of ellipse, parabola and hyperbola by general, Cycloids, Involutes, Normal and tangent to Curves.
Scales: Plain scales, diagonal scales and Vernier scales.

UNIT II

Orthographic Projections: Reference plane, importance of reference lines or Plane, Projections of a point situated in any one of the four quadrants.

Projections of Straight Lines: Projections of straight lines parallel to both reference planes, perpendicular to one reference plane and parallel to other reference plane, inclined to one reference plane and parallel to the other reference plane. Projections of Straight Line Inclined to both the reference planes

UNIT III

Projections of Planes: regular planes Perpendicular to both reference planes, parallel to one reference plane and inclined to the other reference plane; plane inclined to both the reference planes.

UNIT IV

Projections of Solids: Types of solids: Polyhedra and Solids of revolution.

Projections of solids in simple positions: Axis perpendicular to horizontal plane, Axis perpendicular to vertical plane and Axis parallel to both the reference planes, Projection of Solids with axis inclined to one reference plane and parallel to another plane.

UNIT V

Conversion of Views: Conversion of isometric views to orthographic views; Conversion of orthographic views to isometric views.

Computer graphics: Creating 2D&3D drawings of objects including PCB and Transformations using Auto CAD (Not for end examination).

Textbook:

1. N. D. Bhatt, Engineering Drawing, Charotar Publishing House, 2016.

Reference Books:

1. Engineering Drawing, K.L. Narayana and P. Kannaiah, Tata McGraw Hill, 2013.
2. Engineering Drawing, M.B.Shah and B.C. Rana, Pearson Education Inc,2009.
3. Engineering Drawing with an Introduction to AutoCAD, Dhananjay Jolhe, Tata McGraw Hill, 2017.

DEPARTMENT OF COMPUTER SCIENCE ENGINEERING

I Year- II Semester	Course Code: BT24CS1202	L	T	P	C
		0	0	2	1
IT WORKSHOP *(Common to all branches of Engineering)*					

Course Objectives:

- To introduce the internal parts of a computer, peripherals, I/O ports, connecting cables
- To demonstrate configuring the system as Dual boot both Windows and other Operating Systems Viz. Linux, BOSS
- To teach basic command line interface commands on Linux.
- To teach the usage of Internet for productivity and self-paced life-long learning
- To introduce Compression, Multimedia and Antivirus tools and Office Tools such as Word processors, Spread sheets and Presentation tools.

Course Outcomes:

CO1: Apply knowledge for computer assembling and software installation and solve trouble shooting problems (L3)
CO2: Understand hardware components and inter dependencies (L2).
CO3: Evaluate the cyber hygiene that is protecting the personal computer from getting infected with the viruses, worms and other cyber-attacks (L5).
CO4: Use various Microsoft tools like professional word documents and presentations (L2).
CO5: Calculate various excel spreadsheets (L4).
CO6: Build various AI Tools – Chartgpt (L6).

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CO/ PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO 12	PS O1	PS O2
CO1	2	3	2	2	2	-	-	-	-	-	-	-	-	2
CO2	2	3	3	3	-	-	-	-	-	-	-	-	-	-
CO3	2	3	3	2	3	-	-	-	-	-	-	-	-	-
CO4	2	3	3	3	2	-	-	-	-	-	-	-	2	-
CO5	2	3	3	2	2	-	-	-	-	-	-	-	2	-
CO6	3	2	3	2	2	-	-	-	-	-	-	-	-	-

PC Hardware & Software Installation

Task 1: Identify the peripherals of a computer, components in a CPU and its functions. Draw the block diagram of the CPU along with the configuration of each peripheral and submit to your instructor.

Task 2: Every student should disassemble and assemble the PC back to working condition. Lab instructors should verify the work and follow it up with a Viva. Also students need to go through the video which shows the process of assembling a PC. A video would be given as part of the course content.

Task 3: Every student should individually install MS windows on the personal computer. Lab instructor should verify the installation and follow it up with a Viva.

Task 4: Every student should install Linux on the computer. This computer should have windows installed. The system should be configured as dual boot (VMWare) with both Windows and Linux. Lab instructors should verify the installation and follow it up with a Viva

Task 5: Every student should install BOSS on the computer. The system should be configured as dual boot (VMWare) with both Windows and BOSS. Lab instructors should verify the installation and follow it up with a Viva

Internet & World Wide Web

Task1: Orientation & Connectivity Boot Camp: Students should get connected to their Local Area Network and access the Internet. In the process they configure the TCP/IP setting. Finally students should demonstrate, to the instructor, how to access the websites and email. If there is no internet connectivity preparations need to be made by the instructors to simulate the WWW on the LAN.

Task 2: Web Browsers, Surfing the Web: Students customize their web browsers with the LAN proxy settings, bookmarks, search toolbars and pop up blockers. Also, plug-ins like Macromedia Flash and JRE for applets should be configured.

Task 3: Search Engines & Netiquette: Students should know what search engines are and how to use the search engines. A few topics would be given to the students for which they need to search on Google. This should be demonstrated to the instructors by the student.

Task 4: Cyber Hygiene: Students would be exposed to the various threats on the internet and would be asked to configure their computer to be safe on the internet. They need to customize their browsers to block pop ups, block active x downloads to avoid viruses and/or worms.

LaTeX and WORD

Task 1 – Word Orientation: The mentor needs to give an overview of La TeX and Microsoft (MS) office or equivalent (FOSS) tool word: Importance of La TeX and MS office or equivalent (FOSS) tool Word as word Processors, Details of the four tasks and features that would be covered in each, Using La TeXand word – Accessing, overview of toolbars, saving files, Using help and resources, rulers, format painter in word.

Task 2: Using La TeX and Word to create a project certificate. Features to be covered:- Formatting Fonts in word, Drop Cap in word, Applying Text effects, Using Character Spacing, Borders and Colors, Inserting Header and Footer, Using Date and Time option in both La TeX and Word.

Task 3: Creating project abstract Features to be covered:-Formatting Styles, Inserting table, Bullets and Numbering, Changing Text Direction, Cell alignment, Footnote, Hyperlink, Symbols, Spell Check, Track Changes.

Task 4: Creating a Newsletter: Features to be covered:- Table of Content, Newspaper columns, Images from files and clipart, Drawing toolbar and Word Art, Formatting Images, Textboxes, Paragraphs and Mail Merge in word.

EXCEL

Excel Orientation: The mentor needs to tell the importance of MS office or equivalent (FOSS) tool Excel as a Spreadsheet tool, give the details of the four tasks and features that would be covered in each. Using Excel – Accessing, overview of toolbars, saving excel files, Using help and resources.

Task 1: Creating a Scheduler - Features to be covered: Gridlines, Format Cells, Summation, auto fill, Formatting Text

Task 2: Calculating GPA -. Features to be covered:- Cell Referencing, Formulae in excel – average, std. deviation, Charts, Renaming and Inserting worksheets, Hyper linking, Count function,

LOOKUP/VLOOKUP

Task 3: Split cells, freeze panes, group and outline, Sorting, Boolean and logical operators, Conditional formatting

POWER POINT

Task 1: Students will be working on basic power point utilities and tools which help them create basic power point presentations. PPT Orientation, Slide Layouts, Inserting Text, Word Art, Formatting Text, Bullets and Numbering, Auto Shapes, Lines and Arrows in PowerPoint.

Task 2: Interactive presentations - Hyperlinks, Inserting –Images, Clip Art, Audio, Video, Objects, Tables and Charts.

Task 3: Master Layouts (slide, template, and notes), Types of views (basic, presentation, slide slotter, notes etc), and Inserting – Background, textures, Design Templates, Hidden slides.

AI TOOLS – ChatGPT

Task 1: Prompt Engineering: Experiment with different types of prompts to see how the model responds. Try asking questions, starting conversations, or even providing incomplete sentences to see how the model completes them.

• Ex: Prompt: "You are a knowledgeable AI. Please answer the following question: What is the capital of France?"

Task 2: Creative Writing: Use the model as a writing assistant. Provide the beginning of a story or a description of a scene, and let the model generate the rest of the content. This can be a fun way to brainstorm creative ideas

• Ex: Prompt: "In a world where gravity suddenly stopped working, people started floating upwards. Write a story about how society adapted to this new reality."

Task 3: Language Translation: Experiment with translation tasks by providing a sentence in one language and asking the model to translate it into another language. Compare the output to see how accurate and fluent the translations are.

• Ex:Prompt: "Translate the following English sentence to French: 'Hello, how are you doing today?'"

Reference Books:

1. Comdex Information Technology course tool kit, Vikas Gupta, WILEY Dream tech, 2003
2. The Complete Computer upgrade and repair book, Cheryl A Schmidt, WILEY Dream tech, 2013, 3rd edition
3. Introduction to Information Technology, ITL Education Solutions limited, Pearson Education, 2012, 2nd edition
4. PC Hardware - A Handbook, Kate J. Chase, PHI (Microsoft)
5. LaTeX Companion, Leslie Lamport, PHI/Pearson.
6. IT Essentials PC Hardware and Software Companion Guide, David Anfins on and Ken Quamme. – CISCO Press, Pearson Education, 3rd edition
7. IT Essentials PC Hardware and Software Labs and Study Guide, Patrick Regan– CISCO Press, Pearson Education, 3rd edition

DEPARTMENT OF COMPUTER SCIENCE ENGINEERING

I Year- II Semester	Course Code: BT24CS1201	L	T	P	C
		3	0	0	3
DATA STRUCTURES *(Common to CSE and IT)*					

Course Objectives:

- To provide the knowledge of basic data structures and their implementations.
- To understand importance of data structures in context of writing efficient programs.
- To develop skills to apply appropriate data structures in problem solving.

Course Outcomes: At the end of the course, Student will be able to

CO1: Explain the role of linear data structures in organizing and accessing data efficiently in algorithms.

CO2: Design, implement, and apply linked lists for dynamic data storage, demonstrating understanding of memory allocation.

CO3: Develop programs using stacks to handle recursive algorithms, manage program states, and solve related problems.

CO4: Apply queue-based algorithms for efficient task scheduling and breadth-first traversal in graphs and distinguish between deques and priority queues, and apply them appropriately to solve data management challenges.

CO5: Devise novel solutions to small scale programming challenges involving data structures such as stacks, queues, Trees.

CO6: Recognize scenarios where hashing is advantageous, and design hash-based solutions for specific problems.

CO/ PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO 12	PS O1	PS O2
CO1	2	2	2	2	-	-	-	-	-	-	-	2	2	2
CO2	2	2	3	2	-	-	-	-	-	-	-	2	2	2
CO3	2	3	3	2	-	-	-	-	-	-	-	3	2	3
CO4	2	3	3	2	-	-	-	-	-	-	-	2	3	2
CO5	2	3	3	3	-	-	-	-	-	-	-	2	2	2
CO6	2	2	3	3	-	-	-	-	-	-	-	2	2	2

UNIT I

Introduction to Linear Data Structures: Definition and importance of linear data structures, Abstract data types (ADTs) and their implementation, Overview of time and space complexity analysis for linear data structures. Searching Techniques: Linear & Binary Search, Sorting Techniques: Bubble sort, Selection sort, Insertion Sort

UNIT II

Linked Lists: Singly linked lists: representation and operations, doubly linked lists and circular linked lists, Comparing arrays and linked lists, Applications of linked lists.

UNIT III

Stacks: Introduction to stacks: properties and operations, implementing stacks using arrays and linked lists, Applications of stacks in expression evaluation, backtracking, reversing list etc.

UNIT IV

Queues: Introduction to queues: properties and operations, implementing queues using arrays and linked lists, Applications of queues in breadth-first search, scheduling, etc.

Deques: Introduction to deques (double-ended queues), Operations on deques and their applications.

UNIT V

Trees: Introduction to Trees, Binary Search Tree – Insertion, Deletion & Traversal

Hashing: Brief introduction to hashing and hash functions, Collision resolution techniques: chaining and open addressing, Hash tables: basic implementation and operations, Applications of hashing in unique identifier generation, caching, etc.

Textbooks:

1. Data Structures and algorithm analysis in C, Mark Allen Weiss, Pearson, 2nd Edition.
2. Fundamentals of data structures in C, Ellis Horowitz, Sartaj Sahni, Susan Anderson-Freed, Silicon Press, 2008

Reference Books:

1. Algorithms and Data Structures: The Basic Toolbox by Kurt Mehlhorn and Peter Sanders
2. C Data Structures and Algorithms by Alfred V. Aho, Jeffrey D. Ullman, and John E. Hopcroft
3. Problem Solving with Algorithms and Data Structures" by Brad Miller and David Ranum
4. Introduction to Algorithms by Thomas H. Cormen, Charles E. Leiserson, Ronald L. Rivest, and Clifford Stein
5. Algorithms in C, Parts 1-5 (Bundle): Fundamentals, Data Structures, Sorting, Searching, and Graph Algorithms" by Robert Sedgewick

DEPARTMENT OF BASIC SCIENCE AND HUMANITIES

I Year- II Semester	Course Code: BT24BS1209	L	T	P	C
		0	0	2	1
ENGINEERING PHYSICS LAB *(Common to All Branches of Engineering)*					

Course Objectives:
To study the concepts of optical phenomenon like interference, diffraction etc., recognize the importance of energy gap in the study of conductivity and Hall effect in semiconductors and study the parameters and applications of dielectric and magnetic materials by conducting experiments.

Course Outcomes: The students will be able to
CO1: Operate optical instruments like travelling microscope and spectrometer.
CO2: Estimate the wavelengths of different colours using diffraction grating.
CO3: Plot the intensity of the magnetic field of circular coil carrying current with distance.
CO4:Evaluate dielectric constant and magnetic susceptibility for dielectric and magnetic materials respectively.
CO5: Calculate the band gap of a given semiconductor.
CO6: Identify the type of semiconductor using Hall effect.

CO/ PO	PO1	PO2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO1 0	PO 11	PO 12	PS O1	PS O2
CO 1	3	2	-	-	-	-	-	-	1	-	-	1	-	-
CO 2	3	2	-	-	-	-	-	-	1	-	-	1	-	-
CO 3	3	2	-	-	-	-	-	-	1	-	-	1	-	-
CO 4	3	2	-	-	-	-	-	-	1	-	-	1	-	-
CO 5	3	2	-	-	-	-	-	-	1	-	-	1	-	-
CO 6	3	2	-	-	-	-	-	-	1	-	-	1	-	-

List of Experiments:
1. Determination of radius of curvature of a given Plano-convex lens by Newton's rings.
2. Determination of wavelengths of different spectral lines in mercury spectrum using diffraction grating in normal incidence configuration.
3. Verification of Brewster's law
4. Determination of dielectric constant using charging and discharging method.
5. Study the variation of B versus H by magnetizing the magnetic material (B-H curve).
6. Determination of wavelength of Laser light using diffraction grating.
7. Estimation of Planck's constant using photoelectric effect.
8. Determination of the resistivity of semiconductors by four probe methods.
9. Determination of energy gap of a semiconductor using p-n junction diode.
10. Magnetic field along the axis of a current carrying circular coil by Stewart Gee's Method.
11. Determination of Hall voltage and Hall coefficient of a given semiconductor using Hall effect.
12. Determination of temperature coefficients of a thermistor.
13. Determination of acceleration due to gravity and radius of Gyration by using a compound pendulum.
14. Determination of magnetic susceptibility by Kundt's tube method.
15. Determination of rigidity modulus of the material of the given wire using Torsional pendulum.

16. Sonometer: Verification of laws of stretched string.
17. Determination of young's modulus for the given material of wooden scale by nonuniformbending (or double cantilever) method.
18. Determination of Frequency of electrically maintained tuning fork by Melde's experiment.

Note: Any TEN of the listed experiments are to be conducted. Out of which any TWO experiments may be conducted in virtual mode.

References:

1. A Textbook of Practical Physics - S. Balasubramanian, M.N. Srinivasan,S. Chand Publishers, 2017.

Online learning resources :

1. www.vlab.co.in

DEPARTMENT OF ELECTRICAL & ELCTRONICS ENGINEERING

I Year- II Semester	Course Code: BT24EE1204	L	T	P	C
		0	0	3	1.5
ELECTRICAL & ELECTRONICS ENGINEERING WORKSHOP *(Common to All branches of Engineering)*					

Course Objectives: Students will learn

- To verify Kirchhoff's laws.
- To measure various electrical quantities using different types of meters.
- About safety measures used in electrical systems.

Course Outcomes: At the end of the course, the student will be able to
CO1: Study and identification of various electrical circuit components and also measure voltage, current and power electrical circuits.
CO2: Choose and assemble various wiring schemes.
CO3: Solve electrical energy and measure earth resistance for domestic premises.

Mapping of Course Outcomes with Program Outcomes and Program Specific Outcomes:

CO /PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO 11	PO 12	PS O1	PS O2
CO1	3	2	2	-	-	2	2	-	2	1	-	1	2	-
CO2	3	1	-	1	-	-	-	-	2	2	-	1	2	-
CO3	3	2	2	2	2	1	-	-	2	1	-	2	2	2

Part-A BASIC ELECTRICAL ENGINEERING LAB

List of Experiments:

1. Identification of various types of resistors and capacitors and understand the usage of digital multi-meter
2. Study various types of electrical cables/wires, switches, fuses, fuse carriers, MCB, ELCB, RCCB, and MCCB with their specifications and usage.
3. Measurement of Voltage, Current and Power in a DC Circuit
4. Verification of KCL and KVL
5. Measurement of Earth Resistance using Megger
6. Calculation of Electrical Energy for Domestic Premises
7. Staircase wiring scheme
8. Godown wiring scheme

Note: A minimum of six experiments are to be performed.

Reference Books:

1. Engineering Circuits Analysis, Jack Kemmerly,WilliamHayt and Steven Durbin, Tata McGraw Hill Education,2020, 9thedition.
2. Power System Engineering, P.V. Gupta, M.L. Soni, U.S. Bhatnagar and A. Chakrabarti, Dhanpat Rai & Co, 2013
3. Fundamentals of Electrical Engineering, Rajendra Prasad, PHI publishers, 2014, Third Edition
4. Basic Electrical Engineering, D. C. Kulshreshtha, Tata McGraw Hill, 2019, First Edition.

PART B: ELECTRONICS ENGINEERING LAB

Course Objectives: To impart knowledge on the principles of digital electronics and fundamentals of electron devices & its applications.

Course Outcomes: At the end of the course, the student will be able to
CO4: Identify the various electronic components andunderstand the working of components.
CO5: Plot and discuss the characteristics of various electron devices.
CO6: Explain the operation of a digital circuit.

Mapping of Course Outcomes with Program Outcomes and Program Specific Outcomes:

CO/ PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO 11	PO 12	PS O1	PS O2
CO4	3	2	2	-	-	-	-	-	-	1	-	3	2	-
CO5	3	2	2	-	-	-	-	-	-	1	-	3	2	-
CO6	3	2	2	-	-	-	-	-	-	1	-	3	2	-

List of Experiments

1. Plot V-I characteristics of PN Junction diode A) Forward bias B) Reverse bias.
2. Plot V – I characteristics of Zener Diode and its application as voltage Regulator.
3. Implementation of half wave and full wave rectifiers
4. Plot Input & Output characteristics of BJT in CE and CB configurations
5. Frequency response of CE amplifier.
6. Simulation of RC coupled amplifier with the design supplied
7. Verification of Truth Table of AND, OR, NOT, NAND, NOR, Ex-OR, Ex-NOR gates using ICs.
8. Verification of Truth Tables of S-R, J-K& D flip flops using respective ICs.

Tools / Equipment Required: DC Power supplies, Multi meters, DC Ammeters, DC Voltmeters, AC Voltmeters, CROs, all the required active devices.

Reference Books:

1. R. L. Boylestad& Louis Nashlesky, Electronic Devices & Circuit Theory, Pearson Education, 2021.
2. R. P. Jain, Modern Digital Electronics, 4th Edition, Tata Mc Graw Hill, 2009
3. R. T. Paynter, Introductory Electronic Devices & Circuits – Conventional Flow Version, Pearson Education,2009.

Note: A minimum of six experiments are to be performed. All the experiments shall be implemented using both Hardware and Software.

DEPARTMENT OF COMPUTER SCIENCE ENGINEERING

I Year- II Semester	Course Code: BT24CS1203	L	T	P	C
		0	0	3	1.5
DATA STRUCTURES LAB *(Common to CSE and IT)*					

Course Objectives:
The course aims to strengthen the ability of the students to identify and apply the suitable data structure for the given real-world problem. It enables them to gain knowledge in practical applications of data structures.

Course Outcomes: At the end of the course, Student will be able to

CO1: Explain the role of linear data structures in organizing and accessing data efficiently in algorithms

CO2: Design, implement, and apply linked lists for dynamic data storage, demonstrating understanding of memory allocation

CO3: Develop programs using stacks to handle recursive algorithms, manage program states, and solve related problems

CO4: Apply queue-based algorithms for efficient task scheduling and breadth-first traversal in graphs and distinguish between deques and priority queues

CO5: Apply the map propriately to solve data management challenges

CO6: Recognize scenarios where hashing is advantageous, and design hash-based solutions for specific problems

CO /PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO 12	PS O1	PS O2
CO1	3	3	3	3	-	-	-	-	-	-	-	3	2	2
CO2	3	3	3	3	-	-	-	-	-	-	-	2	2	3
CO3	3	2	3	2	-	-	-	-	-	-	-	2	3	2
CO4	3	3	2	2	-	-	-	-	-	-	-	2	2	2
CO5	2	3	3	2	-	-	-	-	-	-	-	2	3	3
CO6	2	3	3	3	-	-	-	-	-	-	-	2	2	2

List of Experiments:

Exercise 1: Array Manipulation

i. Write a program to reverse an array.
ii. C Programs to implement the Searching Techniques – Linear & Binary Search
iii. C Programs to implement Sorting Techniques – Bubble, Selection and Insertion Sort

Exercise 2: Linked List Implementation

i. Implement a singly linked list and perform insertion and deletion operations.
ii. Develop a program to reverse a linked list iteratively and recursively.
iii. Solve problems involving linked list traversal and manipulation.

Exercise 3: Linked List Applications

i. Create a program to detect and remove duplicates from a linked list.
ii. Implement a linked list to represent polynomials and perform addition.
iii. Implement a double-ended queue (deque) with essential operations.

Exercise 4: Double Linked List Implementation

i. Implement a doubly linked list and perform various operations to understand its properties and applications.
ii. Implement a circular linked list and perform insertion, deletion, and traversal.

Exercise 5: Stack Operations

i. Implement a stack using arrays and linked lists.
ii. Write a program to evaluate a postfix expression using a stack.
iii. Implement a program to check for balanced parentheses using a stack.

Exercise 6: Queue Operations

i. Implement a queue using arrays and linked lists.
ii. Develop a program to simulate a simple printer queue system.
iii. Solve problems involving circular queues.

Exercise 7: Stack and Queue Applications

i. Use a stack to evaluate an infix expression and convert it to postfix.
ii. Create a program to determine whether a given string is a palindrome or not.
iii. Implement a stack or queue to perform comparison and check for symmetry.

Exercise 8: Binary Search Tree

i. Implementing a BST using Linked List.
ii. Traversing of BST.

Exercise 9: Hashing

i. Implement a hash table with collision resolution techniques.
ii. Write a program to implement a simple cache using hashing.

Textbooks:

1. Data Structures and algorithm analysis in C, Mark Allen Weiss, Pearson, 2nd Edition.
2. Fundamentals of data structures in C, Ellis Horowitz, Sartaj Sahni, Susan Anderson-Freed, Silicon Press, 2008

Reference Books:

1. Algorithms and Data Structures: The Basic Toolbox by Kurt Mehlhorn and Peter Sanders
2. C Data Structures and Algorithms by Alfred V. Aho, Jeffrey D. Ullman, and John E. Hopcroft
3. Problem Solving with Algorithms and Data Structures" by Brad Miller and David Ranum
4. Introduction to Algorithms by Thomas H. Cormen, Charles E. Leiserson, Ronald L. Rivest, and Clifford Stein
5. Algorithms in C, Parts 1-5 (Bundle): Fundamentals, Data Structures, Sorting, Searching, and Graph Algorithms by Robert Sedgewick

DEPARTMENT OF BASIC SCIENCE AND HUMANITIES

I Year- II Semester	Course Code: BT24BS1211	L	T	P	C
		0	0	1	0.5
NSS and COMMUNITY SERVICE *(Common to All branches of Engineering)*					

Course Objectives:
The objective of introducing this course is to impart discipline, character, fraternity, teamwork, social consciousness among the students and engaging them in selfless service.

Course Outcomes: After completion of the course the students will be able to
CO1: Understand the importance of discipline, character and service motto
CO2: Solve some societal issues by applying acquired knowledge, facts, and techniques.
CO3: Explore human relationships by analyzing social problems
CO4: Determine to extend their help for the fellow beings and downtrodden people.
CO5: Develop leadership skills and civic responsibilities.
CO6: Participate in activities related to health, hygiene, environment, literacy, disaster management, and gender equity with empathy and commitment.

CO/ PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO 12	PS O1	PS O2
CO1	-	-	-	-	-	-	-	3	-	2	-	3	-	-
CO2	-	-	-	-	-	3	-	1	-	2	-	2	-	-
CO3	-	-	-	-	-	-	-	3	-	2	-	2	-	-
CO4	-	-	-	-	-	-	-	2	-	2	-	2	-	-
CO5	-	-	-	-	-	1	3	2	-	2	-	2	-	-
CO6	-	-	-	-	-	2	1	2		2		2	-	-

UNIT I
Orientation
General Orientation on NSS/NCC/ Scouts & Guides/Community Service activities, career guidance.
Activities:

i. Conducting –ice breaking sessions-expectations from the course-knowing personal talents and skills
ii. Conducting orientations programs for the students –future plans-activities-releasing road map etc.
iii. Displaying success stories-motivational biopics- award winning movies on societal issues etc.
iv. Conducting talent show in singing patriotic songs-paintings- any other contribution.

UNIT II
Nature & Care
Activities:

i. Best out of waste competition.
ii. Poster and signs making competition to spread environmental awareness.
iii. Recycling and environmental pollution article writing competition.
iv. Organizing Zero-waste day.
v. Digital Environmental awareness activity via various social media platforms.
vi. Virtual demonstration of different eco-friendly approaches for sustainable living.
vii. Write a summary on any book related to environmental issues.

UNIT III
Community Service
Activities:

i. Conducting One Day Special Camp in a village contacting village-area leaders- Survey in the village, identification of problems- helping them to solve via media- authoritiesexperts-etc.
ii. Conducting awareness programs on Health-related issues such as General Health, Mental health, Spiritual Health, HIV/AIDS,
iii. Conducting consumer Awareness. Explaining various legal provisions etc.
iv. Women Empowerment Programmes- Sexual Abuse, Adolescent Health and Population Education.
v. Any other programmes in collaboration with local charities, NGOs etc.

Reference Books:

1. Nirmalya Kumar Sinha & Surajit Majumder, A Text Book of National Service Scheme Vol;.I, Vidya Kutir Publication, 2021 (ISBN 978-81-952368-8-6)
2. Red Book - National Cadet Corps – Standing Instructions Vol I & II, Directorate General of NCC, Ministry of Defence, New Delhi
3. Davis M. L. and Cornwell D. A., "Introduction to Environmental Engineering", McGraw Hill, New York 4/e 2008
4. Masters G. M., Joseph K. and Nagendran R. "Introduction to Environmental Engineering and Science", Pearson Education, New Delhi. 2/e 2007
5. Ram Ahuja. Social Problems in India, Rawat Publications, New Delhi.

General Guidelines:

1. Institutes must assign slots in the Timetable for the activities.
2. Institutes are required to provide instructor to mentor the students.

Evaluation Guidelines:

1. Evaluated for a total of 100 marks.
2. A student can select 6 activities of his/her choice with a minimum of 01 activity per unit.
3. Each activity shall be evaluated by the concerned teacher for 15 marks, totalling to 90 marks.
4. A student shall be evaluated by the concerned teacher for 10 marks by conducting viva voce on the subject.

DEPARTMENT OF BASIC SCIENCE AND HUMANITIES

I Year- II Semester	Course Code: BT24BS1201	L	T	P	C
		2	0	0	2
COMMUNICATIVE ENGLISH (Common to All Branches of Engineering)					

Course Objectives:

The main objective of introducing this course, *Communicative English,* is to facilitate effective listening, Reading, Speaking and Writing skills among the students. It enhances the same in their comprehending abilities, oral presentations, reporting useful information and providing knowledge of grammatical structures and vocabulary. This course helps the students to make them effective in speaking and writing skills and to make them industry ready.

Course Outcomes:

CO1: Understand the context, theme, and pieces of specific information from social or Transactional dialogues.

CO2: Apply the principles of writing skills and cohesive devices in paragraphs and formal/informal communication.

CO3: Build confidence and creative thinking by challenging the hardships in life.

CO4: Discover the peace and amicable relations in human development.

CO5: Perceive the personal traits and communicative competence in the form of interpersonal communication.

CO6: Form error free sentences in communication by using proper grammatical structures and correct word forms.

CP/ PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO 11	PO 12	PS O1	PS O2
CO1	-	-	-	-	-	-	-	-	-	3	-	-	-	-
CO2	-	-	-	-	-	-	-	-	-	3	-	2	-	-
CO3	-	-	-	-	-	-	-	-	-	3	-	-	-	-
CO4	-	-	-	-	-	-	-	-	-	3	-	-	-	-
CO5	-	-	-	-	-	-	-	-	-	3	-	-	-	-
CO6	-	-	-	-	-	-	-	-	-	3	-	3	-	-

UNIT I **Lesson: HUMAN VALUES: Gift of Magi (Short Story)**

Listening: Identifying the topic, the context and specific pieces of information by listening to short audio texts and answering a series of questions.

Speaking: Asking and answering general questions on familiar topics such as home, family, work, studies and interests; introducing oneself and others.

Reading: Skimming to get the main idea of a text; scanning to look for specific pieces of information.

Writing: Mechanics of Writing-Capitalization, Spellings, Punctuation-Parts of Sentences.

Grammar: Parts of Speech, Basic Sentence Structures-forming questions

Vocabulary: Synonyms, Antonyms, Affixes (Prefixes/Suffixes), Root words.

UNIT II Lesson: NATURE: The Brook by Alfred Tennyson (Poem)

Listening: Answering a series of questions about main ideas and supporting ideas after listening to audio texts.

Speaking: Discussion in pairs / small groups on specific topics followed by short structure talks

Reading: Identifying sequence of ideas; recognizing verbal techniques that help to link the ideas in a paragraph together.

Writing: Structure of a paragraph - Paragraph writing (specific topics)

Grammar: Cohesive devices - linkers, use of articles and zero article; prepositions.

Vocabulary: Homonyms, Homophones, Homographs.

UNIT III Lesson: BIOGRAPHY: Elon Musk

Listening: Listening for global comprehension and summarizing what is listened to.

Speaking: Discussing specific topics in pairs or small groups and reporting what is discussed

Reading : Reading a text in detail by making basic inferences -recognizing and interpreting specific context clues; strategies to use text clues for comprehension.

Writing : Summarizing, Note-making, paraphrasing

Grammar: Verbs - tenses; subject-verb agreement; Compound words, Collocations

Vocabulary: Compound words, Collocations

UNIT IV Lesson: INSPIRATION: The Toys of Peace by Saki

Listening: Making predictions while listening to conversations/ transactional dialogues without video; listening with video.

Speaking: Role plays for practice of conversational English in academic contexts (formal and informal) - asking for and giving information/directions.

Reading: Studying the use of graphic elements in texts to convey information, reveal trends/patterns/relationships, communicate processes or display complicated data.

Writing: Letter Writing: Official Letters, Resumes

Grammar: Reporting verbs, Direct & Indirect speech, Active & Passive Voice

Vocabulary: Words often confused, Jargons

UNIT V Lesson: MOTIVATION: The Power of Intrapersonal Communication (An Essay)

Listening: Identifying key terms understanding concepts and answering a series of relevant questions that test comprehension.

Speaking: Formal oral presentations on topics from academic contexts

Reading: Reading comprehension.

Writing: Writing structured essays on specific topics.

Grammar: Editing short texts –identifying and correcting common errors in grammar and usage (articles, prepositions, tenses, subject verb agreement)

Vocabulary: Technical Jargons

Textbooks:

1. Pathfinder: Communicative English for Undergraduate Students, 1st Edition, Orient Black Swan, 2023 (Units 1,2 & 3)
2. Empowering with Language by Cengage Publications, 2023 (Units 4 & 5)

Reference Books:

1. Dubey, Sham Ji & Co. English for Engineers, Vikas Publishers, 2020
2. Bailey, Stephen. Academic writing: A Handbook for International Students, Routledge,2014.
3. Murphy, Raymond. English Grammar in Use, Fourth Edition, Cambridge University Press, 2019.

DEPARTMENT OF BASIC SCIENCE AND HUMANITIES

I Year- II Semester	Course Code: BT24BS1203	L	T	P	C
		3	0	0	3
ENGINEERING CHEMISTRY *(Common to Civil and Mechanical Engineering)*					

Course Objectives:

- To familiarize engineering chemistry and its applications
- To train the students on the principles and applications of electrochemistry and polymers

Course Outcomes:

At the end of the course, the students will be able to:

CO1: Understand the boiler troubles and different water treatment methods
CO2: Distinguish between batteries ,and fuel cells
CO3: Explain the properties and applications of plastics, elastomers and fuels.
CO4: Apply Composites, refractories, lubricants and cement materials in the field of engineering
CO5: Summarize the concepts of colloids ,micelle ,and Nano-materials
CO6: Describe the corrosion revention methods

CO/ PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO 10	PO 11	PO 12	PS O1	PS O2
CO1	3	2	2	-	-	-	-	-	-	1	-	1	-	-
CO2	3	2	2	-	-	-	-	-	-	1	-	2	-	-
CO3	2	2	2	-	-	-	-	-	-	1	-	2	-	-
CO4	3	2	2	-	-	-	-	-	-	1	-	2	-	-
CO5	3	2	2	-	-	-	-	-	-	1	-	2	-	-
CO6	3	2	2	-	-	-	-	-	-	1	-	2	-	-

UNIT – I Water Technology

Soft and hardwater, Estimation of hardness of water by EDTA Method, Estimation of dissolved Oxygen - Boiler troubles –Priming, foaming, scale and sludge, Caustic embrittlement, Industrial water treatment – Specifications for drinking water, Bureau of Indian Standards(BIS) and World health organization(WHO) standards, Ion- exchange processes - desalination of brackish water, reverse osmosis (RO) and electrodialysis.

UNIT-II Electrochemistry and Applications

Electrodes –electrochemical cell, Nernst equation, cell potential calculations. Primary cells – Zinc-air battery, Secondary cells – Nickel-Cadmium (NiCad),and lithium ion batteries- working principle of the batteries including cell reactions; Fuel cells-Basic Concepts, the principle and working of hydrogen-oxygen Fuel cell. Corrosion: Introduction to corrosion, electrochemical theory of corrosion, differential aeration cell corrosion, galvanic corrosion, metal oxide formation by dry electrochemical corrosion, Pilling Bed worth ratios and uses, Factors affecting the corrosion, cathode and anodic protection, electroplating and electro less plating (Nickel and Copper).

UNIT- III Polymers and Fuel Chemistry

Introduction to polymers, functionality of monomers, Mechanism of chain growth, step growth polymerization. Thermoplastics and Thermo-setting plastics-: Preparation, properties and applications of poly styrene. PVC Nylon 6,6 and Bakelite. Elastomers – Preparation, properties and applications of Buna S, Buna N, Thiokol rubbers. Fuels – Types of fuels, calorific value of fuels, numerical problems based on calorific value; Analysis of coal (Proximate and Ultimate analysis), Liquid Fuels, refining of petroleum, Octane and Cetane number- alternative fuels- propane, methanol, ethanol and bio fuel-bio diesel.

UNIT –IV Modern Engineering Materials

Composites- Definition, Constituents, Classification- Particle, Fibre and Structural reinforced composites, properties and Engineering applications Refractories- Classification, Properties, Factors affecting the refractory materials and Applications. Lubricants- Classification, Functions of lubricants, Mechanism, Properties of lubricating oils – Viscosity, Viscosity Index, Flash point, Fire point, Cloud point, saponification and Applications. Building materials- Portland Cement, constituents, Setting and Hardening of cement.

UNIT- V Surface Chemistry and Nanomaterials

Introduction to surface chemistry, colloids, nanometals and nanometal oxides, micelle formation, synthesis of colloids (Braggs Method), chemical and biological methods of preparation of nanometals and metal oxides, stabilization of colloids and nanomaterials by stabilizing agents, adsorption isotherm (Freundlich and Longmuir), BET equation (no derivation) applications of colloids and nanomaterials – catalysis, medicine, sensors, etc.

Textbooks:

1. Jain and Jain, Engineering Chemistry, 16/e, Dhanpat Rai, 2013.
2. Peter Atkins, Julio de Paula and James Keeler, Atkins' Physical Chemistry, 10/e, Oxford University Press, 2010.

Reference Books:

1. H.F.W. Taylor, Cement Chemistry, 2/e, Thomas Telford Publications, 1997.
2. Textbook of Polymer Science, Fred W. Billmayer Jr, 3rd Edition
3. J. Shaw, Introduction to Colloids and Surface Chemistry, Butterworth-Heineman, 1992
4. A text book of Engineering Chemistry by Sashi Chawala, Dhanpat Rai & Co. 2017.

DEPARTMENT OF BASIC SCIENCE AND HUMANITIES

I Year- II Semester	Course Code: BT24BS1202	L	T	P	C
		3	0	0	3
CHEMISTRY *(Common to ECE, EEE and IT)*					

Course Objectives:
- To familiarize engineering chemistry and its applications
- To train the students on the principles and applications of electrochemistry and polymers

Course Outcomes:
At the end of the course, the students will be able to:
CO1: Understand the fundamentals of Quantum mechanics and Molecular Orbital Theory.
CO2: Apply the basic principles of semiconductors, super conductors, and nanomaterials in real world applications.
CO3: Compare the materials for construction of batteries and electrochemical sensors.
CO4: Explain the preparation, properties, and applications of thermoplastics thermosetting, elastomers and conducting polymers.
CO5: Summarize the concepts of Instrumental methods.
CO6: Define the principles of spectrometry, slc in separation of solid and liquid mixtures.

CO/PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	3	2	2	-	-	-	-	-	-	-	-	1	-	-
CO2	3	2	2	-	-	-	-	-	-	-	-	2	-	-
CO3	2	2	2	-	-	-	-	-	-	-	-	2	-	-
CO4	3	2	2	-	-	-	-	-	-	-	-	2	-	-
CO5	3	2	2	-	-	-	-	-	-	-	-	2	-	-
CO6	3	2	2	-	-	-	-	-	-	-	-	1	-	-

UNIT I Structure and Bonding Models:
Fundamentals of Quantum mechanics, Schrodinger Wave equation, significance of Ψ and Ψ2, particle in one dimensional box, molecular orbital theory – bonding in homo- and heteronuclear diatomic molecules– energy level diagrams of O2 and CO, etc. π-molecular orbitals of butadiene and benzene, calculation of bond order.

UNIT II Modern Engineering materials
Semiconductors – Introduction, basic concept, application
Super conductors-Introduction basic concept, applications.
Super capacitors: Introduction, Basic Concept-Classification – Applications.
Nano materials: Introduction, classification, properties and applications of Fullerenes, carbon nano tubes and Graphene nanoparticles.

UNIT III Electrochemistry and Applications
Electrochemical cell, Nernst equation, cell potential calculations and numerical problems, potentiometer- potentiometric titrations (redox titrations), concept of conductivity, conductivity cell, conductometric titrations (acid-base titrations).
Primary cells – Zinc-air battery, Secondary cells –lithium-ion batteries- working of the batteries including cell reactions; Fuel cells, hydrogen-oxygen fuel cell– working of the cells. Polymer Electrolyte Membrane Fuel cells (PEMFC). Electrochemical sensors – potentiometric sensors with examples, amperometric sensors with examples.

UNIT IV Polymer Chemistry

Introduction to polymers, functionality of monomers, chain growth and step growth polymerization, coordination polymerization, with specific examples and mechanisms of polymer formation.

Plastics –Thermo and Thermosetting plastics, Preparation, properties and applications of – PVC, Teflon, Bakelite, Nylon-6,6, carbon fibres.

Elastomers–Buna-S, Buna-N–preparation, properties and applications. Conducting polymers – polyacetylene, polyaniline, – mechanism of conduction and applications. Bio- Degradable polymers - Poly Glycolic Acid (PGA), Poly Lactic Acid (PLA).

UNIT V Instrumental Methods and Applications

Electromagnetic spectrum. Absorption of radiation: Beer-Lambert's law. UV-Visible Spectroscopy, electronic transition, Instrumentation, IR spectroscopes', fundamental modes and selection rules, Instrumentation. Chromatography-Basic Principle, Classification-HPLC: Principle, Instrumentation and Applications.

Textbooks:

1. Jain and Jain, Engineering Chemistry, 16/e, Dhanpat Rai, 2013.
2. Peter Atkins, Julio de Paula and James Keeler, Atkins' Physical Chemistry, 10/e, Oxford University Press, 2010.

Reference Books:

1. Skoog and West, Principles of Instrumental Analysis, 6/e, Thomson, 2007.
2. J. D. Lee, Concise Inorganic Chemistry, 5th Edition, Wiley Publications, Feb.2008
3. Text book of Polymer Science, Fred W. Billmayer Jr., 3rd Edition
4. A text book of Engineering Chemistry by Sashi Chawala, Dhanpat Rai & Co. 201

DEPARTMENT OF CIVIL ENGINEERING

I Year- II Semester	Course Code: BT24CE1201	L	T	P	C
		3	0	0	3
BASIC CIVIL AND MECHANICAL ENGINEERING (Common to All branches of Engineering)					

Course Objectives:

- Get familiarized with the scope and importance of Civil Engineering sub-divisions.
- Introduce the preliminary concepts of surveying.
- Acquire preliminary knowledge on Transportation and its importance in nation's economy.
- Get familiarized with the importance of quality, conveyance and storage of water.
- Introduction to basic civil engineering materials and construction techniques.

Course Outcomes: On completion of the course, the student should be able to:
CO1: Understand the various sub divisions of Civil Engineering and their role in ensuring better society.
CO2: Know the objectives of surveying and understand the measurement of distances, angles and levels through surveying
CO3: Understand the role of Transportation Engineering in Nation's economy and importance of Water Resource Engineering and Environmental Engineering.

CO/ PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO 12	PS O1	PS O2
CO1	3	1	-	-	-	2	1	1	1	1	2	2	2	2
CO2	3	2	-	-	1	2	-	1	2	1	2	1	2	2
CO3	3	1	-	-	1	2	2	1	1	1	2	2	2	1

Part A: BASIC CIVIL ENGINEERING

UNIT I

Basics of Civil Engineering: Role of Civil Engineers in Society- Various Disciplines of Civil Engineering- Structural Engineering- Geo-technical Engineering- Transportation Engineering Hydraulics and Water Resources Engineering - Environmental Engineering-Scope of each discipline - Building Construction and Planning- Construction Materials-Cement - Aggregate - Bricks- Cement concrete- Steel. Introduction to Prefabricated construction Techniques.

UNIT II

Surveying: Objectives of Surveying- Horizontal Measurements- Angular Measurements- Introduction to Bearings Levelling instruments used for levelling -Simple problems on levelling and bearings- Contour mapping.

UNIT III

Transportation Engineering Importance of Transportation in Nation's economic development- Types of Highway Pavements- Flexible Pavements and Rigid Pavements - Simple Differences. Basics of Harbour, Tunnel, Airport, and Railway Engineering.
Water Resources and Environmental Engineering: Introduction, Sources of water- Quality of water- Specifications- Introduction to Hydrology–Rainwater Harvesting-Water Storage and Conveyance Structures (Simple introduction to Dams and Reservoirs).

Textbooks:

1. Basic Civil Engineering, M.S.Palanisamy, , Tata Mcgraw Hill publications (India) Pvt. Ltd. Fourth Edition.
2. Introduction to Civil Engineering, S.S. Bhavikatti, New Age International Publishers. 2022. First Edition.
3. Basic Civil Engineering, Satheesh Gopi, Pearson Publications, 2009, First Edition.

Reference Books:

6. Surveying, Vol- I and Vol-II, S.K. Duggal, Tata McGraw Hill Publishers 2019. Fifth Edition.
7. Hydrology and Water Resources Engineering, Santosh Kumar Garg, Khanna Publishers, Delhi. 2016
8. Irrigation Engineering and Hydraulic Structures - Santosh Kumar Garg, Khanna Publishers, Delhi 2023. 38th Edition.
9. Highway Engineering, S.K.Khanna, C.E.G. Justo and Veeraraghavan, Nemchand and Brothers Publications 2019. 10th Edition.
10. Indian Standard DRINKING WATER — SPECIFICATION IS 10500-2012.

PART B: BASIC MECHANICAL ENGINEERING

Course Objectives: The students after completing the course are expected to

- Get familiarized with the scope and importance of Mechanical Engineering in different sectors and industries.
- Explain different engineering materials and different manufacturing processes.
- Provide an overview of different thermal and mechanical transmission systems and introduce basics of robotics and its applications.

Course Outcomes: On completion of the course, the student should be able to:
CO4: Understand the different manufacturing processes.
CO5:Explain the basics of thermal engineering and its applications and the working of different mechanical power transmission systems and power plants.
CO6:Describe the basics of robotics and its applications

CO/ PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO 11	PO 12	PS O1	PS O2
CO4	2	-	-	-	-	2	2	-	-	-	-	-	1	-
CO5	2	1	-	-	1	1	-	-	-	-	-	-	-	-
CO6	1	-	-	-	-	1	1	-	-	-	-	-	-	-

UNIT I

Introduction to Mechanical Engineering: Role of Mechanical Engineering in Industries and Society-Technologies in different sectors such as Energy, Manufacturing, Automotive, Aerospace, and Marine sectors.

Engineering Materials - Metals-Ferrous and Non-ferrous, Ceramics, Composites, Smart materials.

UNIT II

Manufacturing Processes: Principles of Casting, Forming, joining processes, Machining, Introduction to CNC machines, 3D printing, and Smart manufacturing.

Thermal Engineering – Working principle of Boilers, Otto cycle, Diesel cycle, Refrigeration and air-conditioning cycles, IC engines, 2-Stroke and 4-Stroke engines, SI/CI Engines, Components of Electric and Hybrid Vehicles.

UNIT III

Power plants – Working principle of Steam, Diesel, Hydro, Nuclear power plants. Mechanical Power Transmission - Belt Drives, Chain, Rope drives, Gear Drives and their applications.
Introduction to Robotics - Joints & links, configurations, and applications of robotics.

(Note: The subject covers only the basic principles of Civil and Mechanical Engineering systems. The evaluation shall be intended to test only the fundamentals of the subject.)

Textbooks:

1. Internal Combustion Engines by V.Ganesan, By Tata McGraw Hill publications (India) Pvt. Ltd.
2. A text book of Theory of Machines by S.S. Rattan, Tata McGraw Hill Publications, (India) Pvt. Ltd.
3. An introduction to Mechanical Engg by Jonathan Wicker and Kemper Lewis, Cengage learning India Pvt. Ltd.

Reference Books:

1. G. Shanmugam and M.S.Palanisamy, Basic Civil and the Mechanical Engineering, Tata McGraw Hill publications (India) Pvt. Ltd.
2. Thermal Engineering by Mahesh M Rathore Tata McGraw Hill publications (India) Pvt. Ltd.
3. 3D printing & Additive Manufacturing Technology- L. Jyothish Kumar, Pulak M Pandey, Springer publications
4. Appuu Kuttan KK, Robotics, I.K. International Publishing House Pvt. Ltd. Volume-I

DEPARTMENT OF MECHANICAL ENGINEERING

I Year- II Semester	Course Code: BT24ME1202	L	T	P	C
		3	0	0	3
ENGINEERING MECHANICS (Common to CE and ME)					

Course Objectives:

- To get familiarized with different types of force systems.
- To draw accurate free body diagrams representing forces and moments acting on a body to analyze the equilibrium of system of forces.
- To teach the basic principles of center of gravity, centroid and moment of inertia and determine them for different simple and composite bodies.
- To apply the Work-Energy method to particle motion.
- To understand the kinematics and kinetics of translational and rotational motion of rigid bodies.

Course Outcomes: On Completion of the course, the student should be able to
CO1: Understand the fundamental concepts in mechanics and determine thefrictional forces for bodies in contact.
CO2: Analyze different force systems such as concurrent, coplanar and spatial systemsand calculate their resultant forces and moments.
CO3: Calculate the centroids, center of gravity and moment of inertia of differentgeometrical shapes.
CO4: Apply the principles of work-energy and impulse-momentum to solve the problems of rectilinear and curvilinear motion of a particle.
CO5: Solve the problems involving the translational and rotational motion of rigid bodies.
CO6: Calculate the equilibrium of systems using work-Energy method

CO/ PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO 11	PO 12	PS O1	PS O2
CO1	3	2	-	-	-	-	-	-	-	1	-	2	-	-
CO2	3	2	1	-	-	1	-	-	-	1	-	2	-	-
CO3	3	3	2	1	-	-	-	-	-	1	-	2	-	-
CO4	3	3	2	1	-	-	-	-	-	1	-	2	-	-
CO5	3	1	1	1	-	-	-	-	-	1	-	2	-	-
CO6	2	3	2	1	-	-	-	-	-	1	-	2	-	-

UNIT I

Introduction to Engineering Mechanics – Basic Concepts. Scope and Applications
Systems of Forces: Coplanar Concurrent Forces– Components in Space–Resultant–Moment of Force and its Application –Couples and Resultant of Force Systems.
Friction: Introduction, limiting friction and impending motion, Coulomb'slaws of dryfriction, coefficient of friction, Cone of Static friction.

UNIT II

Equilibrium of Systems of Forces: Free Body Diagrams, Lami's Theorm, Equations of Equilibrium of Coplanar Systems, Graphical method for the equilibrium, Triangle law of forces, converse of the law of polygon of forces condition of equilibrium, Equations of Equilibrium for Spatial System of forces, Numerical examples on spatial system of forces using vector approach, Analysis of plane trusses, Principle of virtual work with simple examples.

UNIT III

Centroid: Centroids of simple figures (from basic principles)–Centroids of Composite Figures.
Centre of Gravity: Centre of gravity of simple body (from basic principles), Centre of gravity of composite bodies, Pappus theorems.

Area Moments of Inertia: Definition– Polar Moment of Inertia, Transfer Theorem, Moments of Inertia of Composite Figures, Products of Inertia, Transfer Formula for Product of Inertia.
Mass Moment of Inertia: Moment of Inertia of Masses, Transfer Formula for Mass Moments of Inertia, Mass Moment of Inertia of composite bodies.

UNIT IV

Rectilinear and Curvilinear motion of a particle: Kinematics and Kinetics –D'Alembert's Principle - Work Energy method and applications to particle motion-Impulse Momentum method.

UNIT V

Rigid body Motion: Kinematics and Kinetics of translation, Rotation about fixed axis and plane motion, Work Energy method and Impulse Momentum method.

Textbooks:

1. Engineering Mechanics, S. Timoshenko, D. H. Young, J.V. Rao, S. Pati., , McGraw Hill Education 2017. 5th Edition.
2. Engineering Mechanics, P.C.Dumir- S.Sengupta and Srinivas V veeravalli , University press. 2020. First Edition.
3. A Textbook of Engineering Mechanics, S.S Bhavikatti. New age international publications 2018. 4th Edition.

Reference Books:

1. Engineering Mechanics, Statics and Dynamics, Rogers and M A. Nelson., McGraw Hill Education. 2017. First Edition.
2. Engineering Mechanics, Statics and Dynamics, I.H. Shames., PHI, 2002. 4th Edition.
3. Engineering Mechanics, Volume-I: Statics, Volume-II: Dynamics, J. L. Meriam and L. G. Kraige., John Wiley, 2008. 6th Edition.
4. Introduction to Statics and Dynamics, Basudev Battachatia, Oxford University Press, 2014. Second Edition
5. Engineering Mechanics: Statics and Dynamics, Hibbeler R.C., Pearson Education, Inc., New Delhi, 2022, 14th Edition

DEPARTMENT OF ELECTRICAL ELECTRONICS ENGINEERING

I Year- II Semester	Course Code: BT24EE1203	L	T	P	C
		3	0	0	3
NETWORK ANALYSIS (ECE & allied branches)					

Course Objectives: Students will learn

- To introduce basic laws, mesh & nodal analysis techniques for solving electrical circuits
- To impart knowledge on applying appropriate theorem for electrical circuit analysis
- To explain the transient behavior of circuits in time and frequency domains and teach concepts of resonance
- To teach concepts of resonance and introduce open circuit, short circuit, transmission, hybrid parameters, and their interrelationship.

Course Outcomes: At the end of the course, the student will be able to

CO1: Identify basic electrical circuits with nodal and mesh analysis and Apply network theorems for the analysis of AC and DC networks

CO2: Analyze transient response and Steady state response of network.

CO3: Apply nodal and mesh networks, series and parallel circuits, steady state response, different circuit topologies (with R, L and C components).

CO4: Apply steady state response, different circuit topologies (with R, L and C components).

CO5: Analyze the resonant circuits and draw the locus diagrams.

CO6: Develop the parameters of a two-port network.

CO/ PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO 10	PO 11	PO 12	PS O1	PS O2
CO1	3	3	2	2	1	-	-	-	-	-	-	2	-	2
CO2	3	3	2	2	1	-	-	-	-	-	-	2	-	2
CO3	3	3	2	2	1	-	-	-	-	-	-	2	-	2
CO4	3	2	2	1	1	-	-	-	-	-	-	2	-	2
CO5	3	2	2	2	1	-	-	-	-	-	-	2	-	2
CO6	3	3	2	2	2	-	-	-	-	-	-	2	-	2

UNIT I ELECTRICAL CIRCUITS & NETWORK THEOREMS

Types of circuit components, Types of Sources and Source Transformations, Mesh analysis and Nodal analysis, problem solving with resistances only including dependent sources also. Principal of Duality with examples. Network Theorems: Thevenin's, Norton's, Millman's, Reciprocity, Compensation, Substitution, Superposition, Max Power Transfer, and Tellegens-problem solving using dependent sources also

UNIT II TRANSIENTS & LAPLACE TRANSFORM APPLICATIONS

Transients: First order differential equations, Definition of time constants, R-L circuit, R-C circuit with DC excitation, evaluating initial conditions procedure, second order differential equations, homogeneous, non-homogenous, problem-solving using R-L-C elements with DC excitation and AC excitation, Response as related to s-plane rotation of roots. Laplace transform: introduction, Laplace transformation, basic theorems, problem solving using Laplace transform, partial fraction expansion, Heaviside's expansions, problem solving using Laplace transform.

UNIT III SINGLE PHASE AC SYSTEMS

Steady State Analysis of A.C Circuits: Impedance concept, phase angle, series R-L, R-C, R-L- C circuits problem solving. Complex impedance and phasor notation for R-L, R-C, R-L-C problem solving using mesh and nodal analysis, Star-Delta conversion, and problem solving using Laplace transforms also.

UNIT IV MAGNETIC CIRCUITS & RESONANCE

Resonance: Introduction, Definition of Q, Series resonance, Bandwidth of series resonance, Parallel resonance, general case-resistance present in both branches, anti-resonance at all frequencies. Coupled Circuits: Coupled Circuits: Self-inductance, Mutual inductance, Coefficient of coupling, analysis of coupled circuits, Natural current, Dot rule of coupled circuits, conductively coupled equivalent circuits-problem solving.

UNIT V TWO PORT NETWORKS

Two-port Networks: Relationship of two port networks, Z-parameters, Y-parameters, Transmission line parameters, h- parameters, Relationships Between parameter Sets, Parallel & series connection of two port networks, cascading of two port networks, problem solving using dependent sources also. Image and iterative impedances. Image and iterative transfer constants. Insertion loss. Attenuators and pads. Lattice network and its parameters. Impedance matching networks.

Textbooks:

1. Engineering Circuit Analysis by William H. Hayt, Jack Kemmerly, Jamie Phillips, Steven M. Durbin, and 9th Edition 2020.
2. Network lines and Fields by John. D. Ryder 2nd Edition, PHI
3. Network Analysis – ME Van Valkenberg, Prentice Hall of India, revised 3rd Edition, 2019.
4. Circuit Theory, Abhijit Chakrabarti, Dhanpat Rai & Co. Publications, 8th edition, 2023

Reference Books:

1. D. Roy Choudhury, Networks and Systems, New Age International Publications, 2013.
2. Fundamentals of Electric Circuits by Charles K. Alexander and Matthew N. O. Sadiku, McGraw-Hill Education.
3. Joseph Edminister and Mahmood Nahvi, Electric Circuits, Schaum's Outline Series,7 th Edition, Tata McGraw Hill Publishing Company, New Delhi, 2017

E-Resources:

1. https://nptel.ac.in/courses/108105159
2. https://nptel.ac.in/courses/117106108

DEPARTMENT OF ELECTRICAL ELECTRONICS ENGINEERING

I Year- II Semester	Course Code: BT24EE1202	L	T	P	C
		3	0	0	3
ELECTRICAL CIRCUIT ANALYSIS-I (EEE & allied branches)					

Course Objectives: Students will learn

- About various techniques of circuit analysis using resistive circuits and the fundamentals of AC circuit analysis
- About magnetically coupled and 3 – phase circuits and the resonance phenomenon in Electrical circuits.
- About various theorems in Electrical Circuits.

Course Outcomes: At the end of the course, the student will be able to

CO1: Apply nodal and mesh networks, series and parallel circuits, steady-state response, and different circuit topologies (with R, L and C components)
CO2: Analyze the resonant circuits and draw the locus diagrams.
CO3: Apply network theorems for the analysis of DC networks.
CO4: Apply network theorems for the analysis of AC networks.
CO5: Analyze three-phase balanced circuits
CO6: Analyze three-phase unbalanced circuits

CO/ PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO 10	PO 11	PO 12	PS O1	PS O2
CO1	3	3	2	2	-	1	-	-	-	-	-	1	1	1
CO2	3	3	2	2	-	2	-	-	-	-	-	1	1	1
CO3	3	2	2	1	-	2	-	-	-	-	-	1	1	1
CO4	2	2	2	2	-	2	-	-	-	-	-	1	1	1
CO5	3	2	2	1	-	1	-	-	-	-	-	1	1	1
CO6	2	2	2	2	-	1	-	-	-	-	-	1	1	1

UNIT I SINGLE PHASE A.C SYSTEMS

Periodic waveforms - average value, rms value, peak factor and form factor, concept of phasor, phase angle and phase difference, phasor diagrams for lagging, leading networks, complex and polar forms of representations. node and mesh analysis.-Steady state analysis of R, L and C circuits, power factor and its significance, real, reactive and apparent power, waveform of instantaneous power and complex power **.**

UNIT II RESONANCE AND LOCUS DIAGRAMS

Series Resonance: Characteristics of a series resonant circuit, Q-factor, selectivity and bandwidth, expression for half power frequencies; Parallel resonance: Q-factor, selectivity and bandwidth. Locus diagram: RL, RC, RLC with R, L and C variables.

UNIT III NETWORK THEOREMS (DC & AC EXCITATION)

Superposition theorem, Thevenin's theorem, Norton's theorem, Maximum Power Transfer theorem, Reciprocity theorem, Millman's theorem and compensation theorem

UNIT IV BALANCED THREE-PHASE CIRCUITS

Phase sequence, star and delta connection of sources and loads, relation between line and phase voltages and currents, analysis of balanced three phase circuits, measurement of active and reactive power.

UNIT V UNBALANCED THREE-PHASE CIRCUITS

Loop method, Star-Delta transformation technique, two wattmeter method for measurement of three phase power.

Textbooks:

1. Network Analysis, M.E.Van Valkenberg, Pearson Education, 2019, Revised Third Edition.
2. Engineering Circuits Analysis, Jack Kemmerly,William Hayt and Steven Durbin

Reference Books:

1. Fundamentals of Electrical Circuits, Charles K Alexander and Mathew N.O Sadiku,Mc Graw Hill Education (India), 2022, 7th Edition.
2. Electric Circuits, David A. Bell, Oxford University Press, 2009, Seventh Edition.
3. Introductory Circuit Analysis, Robert L Boylestad, Pearson Publications, 2023, Fourteenth Edition.
4. Circuit Theory, Abhijit Chakrabarti, Dhanpat Rai & Co. Publications, 8th edition, 2023
5. Schaum's Outline of Electric Circuits, by Mahmood Nahvi, Joseph Edminister, McGraw Hill; 7th edition (31 December 2017).

E-Resources:

1. https://nptel.ac.in/courses/108105159
2. https://nptel.ac.in/courses/117106108

DEPARTMENT OF BASIC SCIENCE AND HUMANITIES

I Year- II Semester	Course Code: BT24BS1206	L	T	P	C
		0	0	2	1
COMMUNICATIVE ENGLISH LAB (Common to All Branches of Engineering)					

Course Objectives: The main objective of introducing this course, Communicative English Laboratory, is to expose the students to a variety of self-instructional, learner friendly modes of language learning. The students will get trained in basic communication skills and also make them ready to face job interviews.

Course Outcomes:

CO1: Distinguish the English speech sounds, stress, rhythm, intonation and syllable division for better listening and speaking comprehension in day to day conversations.
CO2: Demonstrate communication skills through various language learning activities
CO3: Apply the writing skills in e-mail Writing and Resume Writing.
CO4: Appraise and manifest professionalism in participating group discussions and debates.
CO5: Exhibit the effective interpersonal skills in presentations and interviews
CO6: Understand the different aspects of the English language proficiency with emphasis on LSRW skills.

CO/ PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO 11	PO 12	PS O1	PS O2
CO1	-	-	-	-	3	-	-	-	1	1	-	-	-	-
CO2	-	-	-	-	-	-	-	-	3	3	-	1	-	-
CO3	-	-	-	-	1	-	-	-	1	2	-	2	-	-
CO4	-	-	-	-	-	-	-	-	3	3	-	2	-	-
CO5	-	-	-	-	-	-	-	-	3	3	-	2	-	-
CO6	-	-	-	-	2	-	-	-	-	2	-	2	-	-

List of Topics:

1. Vowels & Consonants
2. Neutralization/Accent Rules
3. Communication Skills & JAM
4. Role Play or Conversational Practice
5. E-mail Writing
6. Resume Writing, Cover letter, SOP
7. Group Discussions-methods & practice
8. Debates - Methods & Practice
9. PPT Presentations/ Poster Presentation
10. Interviews Skills

Suggested Software:

- Walden Infotech
- Young India Films

Reference Books:

1. Raman Meenakshi, Sangeeta-Sharma. Technical Communication. Oxford Press.2018.
2. Taylor Grant: English Conversation Practice, Tata McGraw-Hill Education India, 2016
3. Hewing's, Martin. Cambridge Academic English (B2). CUP, 2012.
4. J. Sethi & P.V. Dhamija. A Course in Phonetics and Spoken English, (2nd Ed),Kindle, 2013

Online learning resources :

Spoken English:

www.esl-lab.com

www.englishmedialab.com

www.englishinteractive.net

https://www.britishcouncil.in/english/online

http://www.letstalkpodcast.com/

https://www.youtube.com/c/mmmEnglish_Emma/featured

https://www.youtube.com/c/ArnelsEverydayEnglish/featured

https://www.youtube.com/c/engvidAdam/featured

https://www.youtube.com/c/EnglishClass101/featured

https://www.youtube.com/c/SpeakEnglishWithTiffani/playlists

https://www.youtube.com/channel/UCV1h_cBE0Drdx19qkTM0WNw

Voice & Accent:

https://www.youtube.com/user/letstalkaccent/videos

https://www.youtube.com/c/EngLanguageClub/featured

https://www.youtube.com/channel/UC_OskgZBoS4dAnVUgJVexc

https://www.youtube.com/channel/UCNfm92h83W2i2ijc5Xwp_IA

DEPARTMENT OF BASIC SCIENCE AND HUMANITIES

I Year- II Semester	Course Code: BT24BS1208	L	T	P	C
		0	0	2	1
ENGINEERING CHEMISTRY LAB *(Common to Civil and Mechanical Engineering)*					

Course Objectives:

- To verify the fundamental concepts with experiments

Course Outcomes: At the end of the course, the students will be able to

CO1: Determine the cell constant and conductance of solutions.
CO2: Prepare advanced polymer materials.
CO3: Determine the physical properties like surface tension, adsorption and viscosity.
CO4: Estimate the Iron and Calcium in cement.
CO5: Calculate the hardness of water.
CO6: Understand the synthesis of Bakelite

CO/ PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO 12	PS O1	PS O2
CO1	3	2	2	-	-	-	-	-	-	-	-	2	-	-
CO2	3	3	2	-	-	-	-	-	-	-	-	2	-	-
CO3	3	2	2	-	-	-	-	-	-	-	-	2	-	-
CO4	3	3	2	-	-	-	-	-	-	-	-	2	-	-
CO5	3	2	2	-	-	-	-	-	-	-	-	2	-	-
CO6	3	2	2	-	-	-	-	-	-	-	-	2	-	-

List of Experiments:

1. Determination of Hardness of a groundwater sample.
2. Estimation of Dissolved Oxygen by Winkler's method
3. Determination of Strength of an acid in Pb-Acid battery
4. Preparation of a polymer (Bakelite)
5. Determination of percentage of Iron in Cement sample by colorimetry
6. Estimation of Calcium in portland Cement
7. Preparation of nanomaterial by precipitation method.
8. Adsorption of acetic acid by charcoal
9. Determination of percentage Moisture content in a coal sample
10. Determination of Viscosity of lubricating oil by Redwood Viscometer 1
11. Determination of Viscosity of lubricating oil by Redwood Viscometer 2
12. Determination of Calorific value of gases by Junker's gas Calorimeter

Reference:

1. "Vogel's Quantitative Chemical Analysis 6th Edition 6th Edition" Pearson Publications by J. Mendham,
2. R.C. Denney, J.D. Barnes and B. Sivasankar

DEPARTMENT OF BASIC SCIENCE AND HUMANITIES

I Year- II Semester	Course Code: BT24BS1207	L	T	P	C
		0	0	2	1

CHEMISTRY LAB
(Common to ECE, EEE and IT)

Course Objectives:

- Verify the fundamental concepts with experiments.

Course Outcomes: At the end of the course, the students will be able to
CO1: Determine the cell constant and conductance of solutions.
CO2: Prepare advanced polymer materials.
CO3: Determine the physical properties like surface tension, adsorption and viscosity.
CO4: Estimate the Iron and Calcium in cement
CO5: Calculate the hardness of water.
CO6: Preparation of a polymer (Bakelite)

CO/ PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO 12	PS O1	PS O2
CO1	3	3	2	3	2	1	2	1	2	1	1	2	-	-
CO2	3	2	3	3	3	1	2	1	2	2	2	3	-	-
CO3	3	3	2	3	2	1	2	1	2	1	1	2	-	-
CO4	3	3	2	3	2	1	2	1	2	1	1	2	-	-
CO5	3	3	2	3	2	1	2	1	2	1	1	2	-	-
CO6	3	**3**	2	**3**	2	**1**	2	**1**	2	**1**	1	**2**	-	-

List of Experiments:

1. Measurement of 10Dq by spectrophotometric method
2. Conductometric titration of strong acid vs. strong base
3. Conductometric titration of weak acid vs. strong base
4. Determination of cell constant and conductance of solutions
5. Potentiometry - determination of redox potentials and emfs
6. Determination of Strength of an acid in Pb-Acid battery
7. Preparation of a Bakelite
8. Verify Lambert-Beer's law
9. Wavelength measurement of sample through UV-Visible Spectroscopy
10. Identification of simple organic compounds by IR
11. Preparation of nanomaterials by precipitation method
12. Estimation of Ferrous Iron by Dichrometry

Reference:

1. "Vogel's Quantitative Chemical Analysis 6th Edition 6th Edition" Pearson Publications by J. Mendham, R.C.Denney, J.D.Barnes and B. Sivasankar

DEPARTMENT OF MECHANICAL ENGINEERING

I Year- II Semester	Course Code: BT24ME1203	L	T	P	C
		0	0	3	1.5
ENGINEERING WORKSHOP (Common to All branches of Engineering)					

Course Objectives:
To familiarize students with wood working, sheet metal operations, fitting, electrical house wiring skills, and basic repairs of two-wheeler vehicle.

Course Outcomes:
CO1: Build carpentry fitting and forging operations in various applications.
CO2: Executing operations of foundry and sheet metal works using varies tools.
CO3: Inspect basic electrical engineering knowledge for house wiring practice
CO4: Develop a lap and butt joint using arc welding.
CO5: Develop pipe joint for different diameter of pipes
CO6: Inspect basic repair of two-wheeler vehicle **.**

CO/ PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO 10	PO 11	PO 12	PS O1	PS O2
CO1	3	-	3	-	2	-	-	3	-	-	-	1	-	-
CO2	3	-	3	-	2	-	-	3	-	-	-	1	-	-
CO3	3	-	3	-	2	-	-	3	-	-	-	1	-	-
CO4	3	-	3	-	2	-	-	3	-	-	-	1	-	-
CO5	3	-	3	-	2	-	-	3	-	-	-	1	-	-
CO6	3	-	3	-	2	-	-	3	-	-	-	1	-	-

SYLLABUS
1. Demonstration: Safety practices and precautions to be observed in workshop.
2. Wood Working: Familiarity with different types of woods and tools used in wood working and make following joints.
   a) Half – Lap joint b) Mortise and Tenon joint c) Corner Dovetail joint or Bridle joint
3. Sheet Metal Working: Familiarity with different types of tools used in sheet metal working, Developments of following sheet metal job from GI sheets.
   a) Tapered tray b) Conical funnel c) Elbow pipe d) Brazing
4. Fitting: Familiarity with different types of tools used in fitting and do the following fitting exercises.
   a) V-fit b) Dovetail fit c) Semi-circular fit d) Bicycle tire puncture and change of two-‘ wheeler tyre
5. Electrical Wiring: Familiarity with different types of basic electrical circuits and make the following connections.
   a) Parallel and series b) Two-way switch c) Godown lighting d) Tube light e) Three phase motor f) Soldering of wires
6. Foundry Trade: Demonstration and practice on Moulding tools and processes, Preparation of Green Sand Moulds for given Patterns.
7. Welding Shop: Demonstration and practice on Arc Welding and Gas welding. Preparation of Lap joint and Butt joint.
8. Plumbing: Demonstration and practice of Plumbing tools, Preparation of Pipe joints with

coupling for same diameter and with reducer for different diameters.

9. Basic repairs of Two-wheeler vehicle – Demonstration of working of two-wheeler vehicle and its repairs.

Textbooks:

1. Basic Workshop Technology: Manufacturing Process, Felix W.; Independently Published,2019. Workshop Processes, Practices and Materials; Bruce J. Black, Routledge publishers, 5th Edn. 2015.
2. A Course in Workshop Technology Vol I. & II, B.S. Raghuwanshi, Dhanpath Rai & Co., 2015 & 2017.

Reference Books:

1. Elements of Workshop Technology, Vol. I by S. K. Hajra Choudhury & Others, Media Promoters and Publishers, Mumbai. 2007, 14th edition
2. Workshop Practice by H. S. Bawa, Tata-McGraw Hill, 2004.
3. Wiring Estimating, Costing and Contracting; Soni P.M. & Upadhyay P.A.; Atul Prakashan, 2021-22.

DEPARTMENT OF CIVIL ENGINEERING

I Year- II Semester	Course Code: BT24CE1202	L	T	P	C
		0	0	3	1.5
ENGINEERING MECHANICS & BUILDING PRACTICES LAB (Civil Engineering & allied branches)					

Course Objectives: The students completing the course are expected to

- Verify the Law of Parallelogram of Forces and Lami's theorem.
- Determine the coefficients of friction of Static and Rolling friction and Centre of gravity of different plane Lamina.
- Understand the layout of a building, concepts of Non-Destructive Testing and different Alternative Materials.

Course Outcomes: On completion of the course, the student should be able to:
CO1: Evaluate the coefficient of friction between two different surfaces and between the inclined plane and the roller.
CO2: Verify Law of Parallelogram of forces and Law of Moment using force Polygon and bell crank lever.
CO3: Determine the Centre of gravity different configurations and
CO4: Understand the Quality Testing and Assessment Procedures and Principles of Non-Destructive Testing.
CO5: Exposure to safety practices in the construction industry.

CO/ PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO 12	PS O1	PS O2
CO1	3	2	-	-	-	-	-	-	-	1	-	2	-	-
CO2	3	2	2	-	-	1	-	-	-	-	-	-	1	-
CO3	2	-	3	-	-	-	-	-	-	-	-	3	2	-
CO4	2	3	-	2	-	-	-	1	-	-	-	-	2	-
CO5	-	-	-	-	2	-	2	-	-	1	-	3	-	-

Students have to perform any 10 of the following Experiments:

1. To study various types of tools used in construction.
2. Forces in Pin Jointed Trusses
3. Experimental Proof of Lami's Theorem
4. Verification of Law of Parallelogram of Forces.
5. Determination of Center of Gravity of different shaped Plane Lamina.
6. Determination of coefficient of Static and Rolling Friction.
7. Verification of Law of Moment using Rotation Disc Apparatus and Bell Crank Lever
8. Study of Alternative Materials like M-sand, Flyash, Sea Sandetc.
9. Field-Visit to understand the Quality Testing- report.
10. Safety Practices in Construction industry
11. Demonstration of Non-Destructive Testing- using Rebound Hammer &UPV
12. Study of Plumbing in buildings

Reference Books:

1. 1. S. Timoshenko, D. H. Young, J.V. Rao, S. Pati., Engineering Mechanics, 5th Edition, McGraw Hill Education.

DEPARTMENT OF MECHANICAL ENGINEERING

I Year- II Semester	Course Code: BT24ME1204	L	T	P	C
		0	0	3	1.5
ENGINEERING MECHANICS LAB (Mechanical Engineering & allied branches)					

Course Objectives: The students completing the course are expected to:

- Verify the Law of Parallelogram and Triangle of Forces.
- Determine the coefficients of friction of Static and Rolling friction and Centre of gravity of different plane Lamina.
- Analyse the system of Pulleys and Moment of Inertia of Compound Pendulum and Flywheel.

Course Outcomes:

CO1: Evaluate the coefficient of friction between two different surfaces and between the inclined plane and the roller.
CO2: Verify Law of Polygon of forces and Law of Moment using force polygon and bell crank lever.
CO3: Determine the Centre of gravity and Moment of Inertia of different configurations.
CO4: Verify the equilibrium conditions of a rigid body under the action of different force systems.
CO5: Determine the coefficients of friction of Static and Rolling friction and Centre of gravity of different plane Lamina.
CO6: Analyse the system of Pulleys and Moment of Inertia of Compound Pendulum and Flywheel**.**

CO/ PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO 11	PO 12	PS O1	PS O2
CO1	3	3	-	2	-	-	-	-	-	-	-	1	3	3
CO2	3	3	-	2	-	-	-	-	-	-	-	1	3	3
CO3	3	3	-	2	-	-	-	-	-	-	-	1	3	3
CO4	3	3	-	2	-	-	-	-	-	-	-	1	3	3
CO5	3	3	-	2	-	-	-	-	-	-	-	1	3	3
CO6	3	3	-	2	-	-	-	-	-	-	-	1	3	3

Students have to perform any 10 of the following Experiments:
List of Experiments:

1. Verification of Law of Parallelogram of Forces.
2. Verification of Law of Triangle of Forces.
3. Verification of the Law of polygon for coplanar-concurrent forces acting on a particle in equilibrium and to find the value of unknown forces considering particle to be in equilibrium using universal force table.
4. Determination of coefficient of Static and Rolling Frictions
5. Determination of Centre of Gravity of different shaped Plane Lamina.
6. Verification of the conditions of equilibrium of a rigid body under the action of coplanar nonconcurrent, parallel force system with the help of a simply supported beam.
7. Study of the systems of pulleys and draw the free body diagram of the system.
8. Determine the acceleration due to gravity using a compound pendulum.
9. Determine the Moment of Inertia of the compound pendulum about an axis perpendicular to

the plane of oscillation and passing through its centre of mass.

10. Determine the Moment of Inertia of a Flywheel.
11. Verification of Law of Moment using Rotation Disc Apparatus and Bell Crank Lever.

References:

2. S. Timoshenko, D. H. Young, J.V. Rao, S. Pati., Engineering Mechanics, 5th Edition, McGraw Hill Education.
3. Hibbeler R.C., Engineering Mechanics: Statics and Dynamics, 14th Edition, Pearson Education, Inc., New Delhi, 2022.

DEPARTMENT OF ELECTRICAL ELECTRONICS ENGINEERING

I Year- II Semester	Course Code: BT24EE1206	L	T	P	C
		0	0	3	1.5
NETWORK ANALYSIS AND SIMULATION LABORATORY (ECE & allied branches)					

Course Objectives: Students will learn

- To gain hands on experience in verifying Kirchhoff's laws and network theorems.
- To analyze transient behavior of circuits
- To study resonance characteristics
- To determine 2-port network parameters

Course Outcomes: At the end of the course, the student will be able to

CO1: Solve Kirchhoff's laws for the given circuits
CO2: Analyze the given Network by applying various Network Theorems.
CO3: Measure the frequency response of RL & RC circuits.
CO4: Analyze the behavior of RL, RC and RLC circuit for different cases.
CO5: Develop the resonant circuit for given specifications.
CO6: Analyze and model the network in terms of all network parameters.

CO/PO /PSO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO 10	PO 11	PO 12	PS O 1	PS O 2
CO1	3	3	2	2	1	-	-	-	1	-	-	1	1	2
CO2	3	3	2	2	1	-	-	-	1	-	-	1	1	2
CO3	3	3	2	3	1	-	-	-	1	-	-	1	1	2
CO4	2	3	3	3	2	-	-	-	1	-	-	1	2	3
CO5	3	3	3	3	2	-	-	-	1	-	-	1	2	3
CO6	2	2	3	3	1	-	-	-	1	-	-	1	2	2

List of Experiments:

1. Study of components of a circuit and verification of KCL and KVL.
2. Verification of mesh and nodal analysis for DC circuits
3. Verification of Superposition theorem for DC circuits
4. Verification of Thevenin's & Norton theorems for DC circuits
5. Verification of maximum power transfer theorem for DC circuits
6. Determination of open circuit (Z) and short circuit (Y) parameters
7. Determination of hybrid (H) and transmission (ABCD) parameters
8. Find the Q Factor and Bandwidth of a Series and Parallel Resonance circuit.
9. Simulation and analysis of DC transients in RL, RC and RLC circuits.
10. Study frequency response of various 1st order RL & RC networks
11. Verification of Reciprocity theorem using simulation tools.
12. Verification of Compensation theorem using simulation tools.

Reference Books:

1. Engineering Circuits Analysis, Jack Kemmerly,William Hayt and Steven Durbin, Tata McGraw Hill Education,2020, 9thedition.
2. Network Analysis, M.E.VanValkenburg, Pearson Education, 2019, Revised Third Edition.
3. Circuit Theory, Abhijit Chakrabarti, Dhanpat Rai & Co. Publications, 8th edition, 2023

DEPARTMENT OF ELECTRICAL ELECTRONICS ENGINEERING

I Year- II Semester	Course Code: BT24EE1205	L	T	P	C
		0	0	3	1.5
ELECTRICAL CIRCUITS LAB (EEE & allied branches)					

Course Objectives: Students will learn

- To verify Kirchhoff's laws.
- To verify the theorems of electrical circuits.
- The concept of self, mutual inductance phenomenon and measure parameters of iron cored inductor.
- About the resonance phenomenon for series/parallel RLC circuits

Course Outcomes: At the end of the course, the student will be able to

CO1: Solve the given Electrical Network by using Mesh and Nodal Analysis
CO2: Analyze the given Network by applying various Network Theorems
CO3: Draw locus diagrams of RL, RC series circuits and verify network theorems theoretically and practically
CO4: Determine self, mutual inductances and coefficient of coupling values, parameters of choke coil
CO5: Calculate the power consumed by 3-ϕ balanced and unbalanced loads
CO6: Calculate cold, hot resistance and choke coil parameters of electric lamps

CO/ PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO 10	PO 11	PO 12	PS O1	PS O2
CO1	3	2	2	-	-	2	2	-	2	1	-	1	2	-
CO2	3	3	-	1	2	1	-	-	2	2	-	1	2	2
CO3	3	1	-	1	-	-	-	-	2	2	-	1	2	-
CO4	3	2	2	2	2	1	-	-	2	1	-	2	2	2
CO5	3	1	-	1	-	-	-	-	2	2	-	1	2	-
CO6	3	1	-	-	1	1	-	-	1	2	-	1	1	-

Experiments:

1. Verification of network reduction techniques.
2. Verification of node and mesh analysis.
3. Determination of cold and hot resistance of an electric lamp
4. Determination of Parameters of a choke coil.
5. Determination of self, mutual inductances, and coefficient of coupling
6. Series resonance
7. Locus diagrams of R-L(L Variable) and R-C (C Variable)series circuits
8. Verification of Superposition theorem
9. Verification of Thevenin's and Norton's Theorems
10. Verification of Maximum power transfer theorem
11. Verification of Compensation theorem
12. Verification of Reciprocity and Millman's Theorems
13. Measurement of 3-phase power by two-wattmeter method for balanced loads
14. Measurement of 3-phase power by two-wattmeter method for unbalanced loads

Reference Books:

1. Engineering Circuits Analysis, Jack Kemmerly,William Hayt and Steven Durbin, Tata McGraw Hill Education,2020, 9thedition.
2. Network Analysis, M.E.VanValkenburg, Pearson Education, 2019, Revised Third Edition.
Circuit Theory, Abhijit Chakrabarti, Dhanpat Rai & Co. Publications, 8th edition, 2023

DEPARTMENT OF BASIC SCIENCE AND HUMANITIES

I Year- II Semester	Course Code: BT24BS1210	L	T	P	C
		0	0	1	0.5
HEALTH AND WELLNESS, YOGA AND SPORTS (Common to All branches of Engineering)					

Course Objectives: The main objective of introducing this course is to make the students maintain their mental and physical wellness by balancing emotions in their life. It mainly enhances the essential traits required for the development of the personality.

Course Outcomes: After completion of the course the student will be able to
CO1: Understand the importance of yoga and sports for Physical fitness and sound health.
CO2: Demonstrate an understanding of health-related fitness components.
CO3: Compare and contrast various activities that help enhance their health.
CO4: Assess current personal fitness levels.
CO5: Develop Positive Personality.
CO6: Describe the history of sports, Ancient and Modern Olympics

CO/ PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	-	-	-	-	-	-	-	-	-	-	-	2	-	-
CO2	-	-	-	-	-	-	-	-	-	-	-	2	-	-
CO3	-	-	-	-	-	-	-	-	-	-	-	2	-	-
CO4	-	-	-	-	-	-	-	-	-	-	-	2	-	-
CO5	-	-	-	-	-	-	-	-	-	-	-	2	-	-
CO6	-	-	-	-	-	-	-	-	-	-	-	2	-	-

UNIT I Concept of health and fitness, Nutrition and Balanced diet, basic concept of immunity Relationship between diet and fitness, Globalization and its impact on health, Body Mass Index (BMI) of all age groups.
Activities:
i) Organizing health awareness programmes in community
ii) Preparation of health profile
iii) Preparation of chart for balance diet for all age groups

UNIT II Concept of yoga, need for and importance of yoga, origin and history of yoga in Indian context, classification of yoga, Physiological effects of Asanas- Pranayama and meditation, stress management and yoga, Mental health and yoga practice.
Activities: Yoga practices – Asana, Kriya, Mudra, Bandha, Dhyana, Surya Namaskar

UNIT III Concept of Sports and fitness, importance, fitness components, history of sports, Ancient and Modern Olympics, Asian games and Commonwealth games.
Activities:
i) Participation in one major game and one individual sport viz., Athletics, Volleyball, Basketball, Handball, Football, Badminton, Kabaddi, Kho-kho, Table tennis, Cricket etc. Practicing general and specific warm up, aerobics
ii) Practicing cardiorespiratory fitness, treadmill, run test, 9 min walk, skipping and running.

Reference Books:

- Gordon Edlin, Eric Golanty. Health and Wellness, 14th Edn. Jones & Bartlett Learning, 2022
- T.K.V.Desikachar. The Heart of Yoga: Developing a Personal Practice
- Archie J.Bahm. Yoga Sutras of Patanjali, Jain Publishing Company, 1993
- Wiseman, John Lofty, SAS Survival Handbook: The Ultimate Guide to Surviving Anywhere Third Edition, William Morrow Paperbacks, 2014
- The Sports Rules Book/ Human Kinetics with Thomas Hanlon. -- 3rd ed. Human Kinetics, Inc.2014

General Guidelines:

- Institutes must assign slots in the Timetable for the activities of Health/Sports/Yoga.
- Institutes must provide field/facility and offer the minimum of five choices of as many as Games/Sports.
- Institutes are required to provide sports instructor / yoga teacher to mentor the students. Evaluation

Guidelines:

- Evaluated for a total of 100 marks.
- A student can select 6 activities of his/her choice with a minimum of 01 activity per unit. Each activity shall be evaluated by the concerned teacher for 15 marks, totalling to 90 marks.
- A student shall be evaluated by the concerned teacher for 10 marks by conducting viva voce on the subject

DR24

ENGINEERING CURRICULUM

W.e.f. 2024-25

II YEAR - I SEMESTER

B.Tech. (Regular-Full time)

(Effective for the students admitted into I year from
The Academic Year **2024-25** onwards)

DEPARTMENT OF CIVIL ENGINEERING

B.Tech. II Year I Semester (DR24) - Civil Engineering

S.No.	Category	Subject Code	Title	L	T	P	Credits
1	BS	BT24BS2101	Numerical Techniques and Statistical Methods	3	0	0	3
2	HSMC	BT24HS2101	Universal human values – Understanding harmony and Ethical human conduct	2	1	0	3
3	Engineering Science	BT24CE2101	Surveying	3	0	0	3
4	Professional Core	BT24CE2102	Strength of Materials	3	0	0	3
5	Professional Core	BT24CE2103	Fluid Mechanics	3	0	0	3
6	Professional Core	BT24CE2104	Surveying Field work Lab	0	0	3	1.5
7	Professional Core	BT24CE2105	Strength of Materials Lab	0	0	3	1.5
8	Skill Enhancement Course	BT24CE2106	Building Planning and Drawing	0	1	2	2
9	Audit Course	BT24BS2106	Environmental Science	2	0	0	-
Total				**14**	**2**	**8**	**20**

B.Tech. II Year II Semester (DR24) - Civil Engineering

S.No.	Category	Subject Code	Title	L	T	P	Credits
1	Management Course-I	BT24HS2201	Managerial Economics and Financial Analysis	2	0	0	2
2	Engineering Science / Basic Science	BT24CE2201	Engineering Geology	3	0	0	3
3	Professional Core	BT24CE2202	Concrete Technology	3	0	0	3
4	Professional Core	BT24CE2203	Structural Analysis	3	0	0	3
5	Professional Core	BT24CE2204	Hydraulics & Hydraulic Machinery	3	0	0	3
6	Professional Core	BT24CE2205	Concrete Technology Lab	0	0	3	1.5
7	Professional Core	BT24CE2206	Engineering Geology lab	0	0	3	1.5
8	Skill Enhancement course	BT24CE2207	Remote Sensing & Geographical Information Systems	0	1	2	2
9	Engineering Science	BT24ME2207	Design Thinking & Innovation	1	0	2	2
10	Mandatory course	BT24CE2208	Building materials and Construction	3	0	0	-
Total				**18**	**1**	**10**	**21**
Note: An 8 weeks community service project will be evaluated in III year – I semester							

DEPARTMENT OF BASIC SCIENCE AND HUMANITIES

II Year – I Semester		L	T	P	C
Course Code:	BT24BS2101	3	0	0	3
NUMERICAL TECHNIQUES AND STATISTICAL METHODS					

Course Objectives: Students will learn

1 To elucidate the different numerical methods to solve nonlinear algebraic equations
2 To disseminate the use of different numerical techniques for carrying out numerical integration.
3 To familiarize the students with the foundations of probability and statistical methods.
4 To equip the students to solve application problems in their disciplines.

Course Out Comes: At the end of the course, the student will be able to

CO1	Apply Newton's forward & backward interpolation and Lagrange's formulae for equal and unequal intervals	Apply
CO2	Apply numerical integral techniques to different Engineering problems. Apply different algorithms for approximating the solutions of ordinary differential equations with initial conditions to its analytical computations	Apply
CO3	Apply discrete and continuous probability distributions	Apply
CO4	Compute the mathematical expectation (mean) and variance of random variables	Evaluate
CO5	Design the components of a classical hypo thesis	Create
CO6	Infer the statistical inferential methods based on small and large sampling tests	Analyze

CO-PO Mapping:

CO/ PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	3	3	-	-	-	-	-	-	-	-	-	-
CO2	3	3	-	-	-	-	-	-	-	-	-	-
CO3	3	2	-	-	-	-	-	-	-	-	-	-
CO4	3	2	-	-	-	-	-	-	-	-	-	-
CO5	2	2	-	-	-	-	-	-	-	-	-	-
CO6	3	3	-	-	-	-	-	-	-	-	-	-
Level of Mapping- 3: High; 2: Moderate; 1-Low												

CO/ PSO	PSO1	PSO2
CO1	-	-
CO2	-	-
CO3	-	-
CO4	-	-
CO5	-	-
CO6	-	-

Detailed Syllabus:

UNIT I Iterative Methods

Introduction – Solutions of algebraic and transcendental equations: Bisection method – Secant method – Method of false position – Iteration method – Newton-Raphson method (One variable and simultaneous Equations)

Interpolation: Newton's forward and backward formulae for interpolation – Interpolation with unequal intervals – Lagrange's interpolation formula.

UNIT II Numerical integration, Solution of ordinary differential equations with initial conditions

Trapezoidal rule– Simpson's 1/3rd and 3/8th rule– Solution of initial value problems by Taylor's series– Picard's method of successive approximations– Euler's method–Runge -Kutta method (second and fourth order) – Milne's Predictor and Corrector Method.

UNIT III Probability and Distributions

Baye's theorem – Random variables – Discrete and Continuous random variables – Distribution functions – Probability mass function, Probability density function and Cumulative distribution functions – Mathematical Expectation and Variance – Binomial, Poisson, Uniform and Normal distributions.

UNIT IV Sampling Theory

Introduction – Population and Samples – Sampling distribution of Means and Variance (definition only) – Point and Interval estimations – Maximum error of estimate – Central limit theorem (without proof) – Estimation using t, z2 and F-distributions.

UNIT V Tests of Hypothesis

Introduction – Hypothesis – Null and Alternative Hypothesis – Type I and Type II errors – Level of significance– One tail and two-tail tests – Test of significance for large samples and Small Samples: Single and difference means – Single and two proportions – Student's t- test, F-test, z2-test.

TextBooks:

1 B. S. Grewal, Higher Engineering Mathematics, 44th Edition, Khanna Publishers.
2 Miller and Freund's, Probability and Statistics for Engineers,7/e, Pearson, 2008.

References:

1 Steven C. Chapra, Applied Numerical Methods with MATLAB for Engineering and Science, Tata Mc. Graw Hill Education.
2 M.K.Jain, S.R.K. Iyengar and R.K. Jain, Numerical Methods for Scientific and Engineering Computation, New Age International Publications.
3 Lawrence Turyn, Advanced Engineering Mathematics, CRC Press.
4 S.C.Gupta and V.K. Kapoor, Fundamentals of Mathematical Statistics, 11/e, Sultan Chand & Sons Publications, 2012.
5 Shron L.Myers, Keying Ye, Ronald E Walpole, Probability and Statistics Engineers and the Scientists,8th Edition, Pearson 2007.
6 Jay l. Devore, Probability and Statistics for Engineering and the Sciences, 8th Edition, Cengage.

DEPARTMENT OF BASIC SCIENCE AND HUMANITIES

II Year I Semester		L	T	P	C
Course Code:	BT24HS2101	2	1	0	3
UNIVERSAL HUMAN VALUES – UNDERSTANDING HARMONY AND ETHICAL HUMAN CONDUCT					

Course Objectives: Students will learn

1. To help the students appreciate the essential complementary between 'VALUES' and 'SKILLS' to ensure sustained happiness and prosperity which are the core aspirations of all human beings.
2. To facilitate the development of a Holistic perspective among students towards life and profession as well as towards happiness and prosperity based on a correct understanding of the Human reality and the rest of existence. Such holistic perspective forms the basis of Universal Human Values and movement towards value-based living in a natural way.
3. To highlight plausible implications of such a Holistic understanding in terms of ethical human conduct, trustful and mutually fulfilling human behavior and mutually enriching interaction with Nature.

Course Outcomes:

CO1	Define the terms like Natural Acceptance, Happiness and Prosperity	Remember
CO2	Identify one's self, and one's surroundings (family, society nature)	Understand
CO3	Apply what they have learnt to their own self in different day-to-day settings in real life	Apply
CO4	Relate human values with human relationship and human society.	Analyze
CO5	Justify the need for universal human values and harmonious existence	Evaluate
CO6	Develop as socially and ecologically responsible engineers	Apply

CO-PO Mapping:

CO/ PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	-	-	-	-	-	-	3	3	-	2	-	3
CO2	-	-	-	-	-	-	-	3	2	2	-	3
CO3	-	-	-	-	-	-	-	3	2	-	-	2
CO4	-	-	-	-	-	-	3	3	2	2	-	3
CO5	-	-	-	-	-	-	3	3	-	-	-	3
CO6	-	-	-	-	-	-	3	2	-	-	-	-
Level of Mapping- 3: High; 2: Moderate; 1-Low												

CO/ PSO	PSO1	PSO2
CO1	-	-
CO2	-	-
CO3	-	-
CO4	-	-
CO5	-	-
CO6	-	-

Detailed Syllabus:

UNIT I

Introduction to Value Education (6 Lectures and 3 Tutorials for Practice session)
Lecture 1: Right Understanding, Relationship and Physical Facility (Holistic Development and theRole of Education)
Lecture 2: Understanding Value Education
Tutorial 1: Practice Session PS1 Sharing about Oneself Lecture 3: self-exploration as the Process for Value Education
Lecture 4: Continuous Happiness and Prosperity – the Basic Human Aspirations
Tutorial 2: Practice Session PS2 Exploring Human Consciousness
Lecture 5: Happiness and Prosperity – Current Scenario
Lecture 6: Method to Fulfill the Basic Human Aspirations Tutorial 3: Practice Session PS3 Exploring Natural Acceptance

UNIT II

Harmony in the Human Being (6 Lectures and 3 Tutorials for Practice session)
Lecture 7: Understanding Human being as the Co-existence of the self and the body.
Lecture 8: Distinguishing between the Needs of the self and the body
Tutorial 4: Practice Session PS4 Exploring the difference of Needs of self and body.
Lecture 9: The body as an Instrument of the self
Lecture 10: Understanding Harmony in the self
Tutorial 5: Practice Session PS5 Exploring Sources of Imagination in the self
Lecture 11: Harmony of the self with the body
Lecture 12: Programme to ensure self-regulation and Health
Tutorial 6: Practice Session PS6 Exploring Harmony of self with the body

UNIT III

Harmony in the Family and Society (6 Lectures and 3 Tutorials for Practice session)
Lecture 13: Harmony in the Family – the Basic Unit of Human Interaction
Lecture 14: 'Trust' – the Foundational Value in Relationship
Tutorial 7: Practice Session PS7 Exploring the Feeling of Trust
Lecture 15: 'Respect' – as the Right Evaluation
Tutorial 8: Practice Session PS8 Exploring the Feeling of Respect
Lecture 16: Other Feelings, Justice in Human-to-Human Relationship
Lecture 17: Understanding Harmony in the Society
Lecture 18: Vision for the Universal Human Order
Tutorial 9: Practice Session PS9 Exploring Systems to fulfil Human Goal

UNIT IV

Harmony in the Nature/Existence (4Lectures and 2Tutorials for P ractice session)
Lecture 19: Understanding Harmony in the Nature
Lecture 20: Interconnectedness, self-regulation and Mutual Fulfilment among the Four orders of Nature
Tutorial 10: Practice Session PS10 Exploring the Four Orders of Nature
Lecture 21: Realizing Existence as Co-existence at All Levels

Lecture 22: The Holistic Perception of Harmony in Existence
Tutorial 11: Practice Session PS11 Exploring Co-existence in Existence

UNIT V

Implications of the Holistic Understanding – a Look at Professional Ethics
(6 Lectures and 3 Tutorials for Practice session)
Lecture 23: Natural Acceptance of Human Values
Lecture 24: Definitiveness of (Ethical) Human Conduct
Tutorial 12: Practice Session PS12 Exploring Ethical Human Conduct
Lecture 25: A Basis for Humanistic Education, Humanistic Constitution and Universal Human Order
Lecture 26: Competence in Professional Ethics
Tutorial 13: Practice Session PS13 Exploring Humanistic Models in Education
Lecture 27:Holistic Technologies, Production Systems and Management Models-Typical Case Studies
Lecture 28: Strategies for Transition towards Value-based Life and Profession
Tutorial 14: Practice Session PS14 Exploring Steps of Transition towards Universal Human Order

Practice Sessions:

Unit I	Introduction to Value Education PS1 Sharing about Oneself PS2 Exploring Human Consciousness PS3 Exploring Natural Acceptance
Unit II	Harmony in the Human Being PS4 Exploring the difference of Needs of self and body PS5 Exploring Sources of Imagination in the self PS6 Exploring Harmony of self with the body
Unit III	Harmony in the Family and Society PS7 Exploring the Feeling of Trust PS8 Exploring the Feeling of Respect PS9 Exploring Systems to fulfil Human Goal
Unit IV	Harmony in the Nature (Existence) PS10 Exploring the Four Orders of Nature PS11 Exploring Co-existence in Existence
Unit V	Implications of the Holistic Understanding– a Look at Professional Ethics PS12 Exploring Ethical Human Conduct PS13 Exploring Humanistic Models in Education PS14 Exploring Steps of Transition towards Universal Human Order

TextBooks:

1 R R Gaur, R Asthana, G P Bagaria, A Foundation Course in Human Values and Professional Ethics, 2nd Revised Edition, Excel Books, New Delhi, 2019. ISBN 978-93-87034-47-1
2 R R Gaur, R Asthana, G P Bagaria, Teachers' Manual for A Foundation Course in Human Values and Professional Ethics, 2nd Revised Edition, Excel Books, New Delhi, 2019. ISBN 978-93-87034- 53-2

References:

1 JeevanVidya: EkParichaya, A Nagaraj, Jeevan VidyaPrakashan, Amarkantak, 1999.
2 Human Values, A.N. Tripathi, New Age Intl. Publishers, New Delhi, 2004.
3 The Story of Stuff (Book).
4 The Story of My Experiments with Truth - by Mohandas Karamchand Gandhi
5 Small is Beautiful - E. F Schumacher.
6 Slow is Beautiful - Cecile Andrews
7 Economy of Permanence - J C Kumarappa
8 Bharat Mein Angreji Raj – PanditSunderlal
9 Rediscovering India - by Dharampal
10 Hind Swaraj or Indian Home Rule - by Mohandas K. Gandhi

11 India Wins Freedom - Maulana Abdul Kalam Azad
12 Vivekananda - Romain Rolland (English)
13 Gandhi - Romain Rolland (English)

Mode of Conduct:
Lecture hours are to be used for interactive discussion, placing the proposals about the topics at hand and motivating students to reflect, explore and verify them. Tutorial hours are to be used for practice sessions. While analyzing and discussing the topic, the faculty mentor's role is in pointing to essential elements to help in sorting them out from the surface elements. In other words, help the students explore the important or critical elements. In the discussions, particularly during practice sessions (tutorials), the mentor encourages the student to connect with one's own self and do self-observation, self-reflection and self- exploration. Scenarios may be used to initiate discussion. The student is encouraged to take up "ordinary" situations rather than "extra-ordinary" situations. Such observations and their analyses are shared and discussed with other students and faculty mentor, in a group sitting.

Tutorials (experiments or practical) are important for the course. The difference is that the laboratory is everyday life, and practical are how you behave and work in real life. Depending on the nature of topics, worksheets, home assignment and/or activity are included. The practice sessions (tutorials) would also provide support to a student in performing actions commensurate to his/her beliefs. It is intended that this would lead to development of commitment, namely behaving and working based on basic human values. It is recommended that this content be placed before the student as it is, in the form of a basic foundation course, without including anything else or excluding any part of this content. Additional content may be offered in separate, higher courses. This course is to be taught by faculty from every teaching department, not exclusively by any one department. Teacher preparation with a minimum exposure to at least one 8-day Faculty Development Program on Universal Human Values is deemed essential.

Online Resources:
1.https://fdp-si.aicte-india.org/UHVII%20Class%20Notes%20&%20Handouts/UHV%20Handout%201- Introduction%20to%20Value%20Education.pdf
2.https://fdp-si.aicte-india.org/UHVII%20Class%20Notes%20&%20Handouts/UHV%20Handout%202-Harmony%20in%20the%20Human%20Being.pdf
3.https://fdp-si.aicte-india.org/UHV-II%20Class%20Notes%20&%20Handouts/UHV%20Handout%203-Harmony%20in%20the%20 Family.pdf
4.https://fdp-si.aicte-india.org/UHV%201%20Teaching%20Material/D3-S2%20Respect%20July%2023.pdf
5.https://fdp-si.aicte-india.org/UHV-II%20Class%20Notes%20&%20Handouts/UHV%20Handout%205- Harmony%20in%20the%20Nature%20and%20Existence.pdf
6.https://fdp-si.aicte-india.org/download/FDPTeachingMaterial/3-days%20FDP-SI%20UHV%20Teaching%20Material/Day%203%20Handouts/UHV%203D%20D3-S2A%20Und%20Nature-Existence.pdf
7.https://fdp-si.aicteindia.org/UHV%20II%20Teaching%20Material/UHV%20II%20Lecture%2023-25%20Ethics%20v1.pdf
8.https://www.studocu.com/in/document/kiet-group-of-institutions/universal-human-values/chapter-5- holistic-understanding-of-harmony-on-professional-ethics/62490385
9.https://onlinecourses.swayam2.ac.in/aic22_ge23/preview

DEPARTMENT OF CIVIL ENGINEERING

II	Year	I	Semester	L	T	P	C
Course Code:		**BT24CE2101**		**3**	**0**	**0**	**3**
SURVEYING							

Course Objectives: Students will learn

1. Know the principle and methods of surveying and measuring of horizontal and vertical- distances and angles
2. Identification of source of errors and rectification methods
3. Know surveying principles to determine areas and volumes
4. Setting out curves and use modern surveying equipment for accurate results
5. Know the basics of Photogrammetry Surveying

Course OutComes: At the end of the course, the student will be able to

CO	Statement	BL
CO1	Apply the principle and methods of surveying and measuring of horizontal and vertical- distances and angles	**L2**
CO2	Identify the source of errors and rectification methods	**L3**
CO3	Apply surveying principles to determine areas and volumes	**L2**
CO4	Setting out curves and using modern surveying equipment	**L3**
CO5	Apply the basics of Photogrammetry Surveying in field	**L4**

CO-PO Mapping:

CO/ PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	3	3	-	2	1	3	-	3	3	3	-	1
CO2	3	2	-	2	2	2	-	2	2	2	-	2
CO3	3	1	-	1	1	1	-	1	2	2	-	2
CO4	3	3	-	3	3	1	-	1	1	1	-	2
CO5	3	1	-	3	3	1	-	1	1	1	-	2
Mapping-	**3: High;**			**2: Moderate;**			**1-Low**					

CO/ PSO	PSO1	PSO2
CO1	1	1
CO2	2	-
CO3	3	1
CO4	1	3
CO5	3	2

Detailed Syllabus:

UNIT I

Introduction and Basic Concepts: Introduction, Objectives, classification and principles of surveying, surveying accessories. Introduction to Compass, leveling and Plane table surveying.

Linear distances- Approximate methods, Direct Methods- Chains- Tapes, ranging, Tape corrections. Prismatic Compass- Bearings, included angles, Local Attraction, Magnetic Declination, and dip – systems and W.C.B and Q.B systems of locating bearings.

UNIT II

Leveling- Types of levels, methods of levelling, and Determination of levels, Effect of Curvature of Earth and Refraction.Contouring - Characteristics and uses of Contours, methods of contour surveying. Areas-Determination of areas consisting of irregular boundary and regular boundary.

Volumes - Determination of volume of earth work in cutting and embankments for level section, capacity of reservoirs.

UNIT III

Theodolite Surveying: Types of Theodolites, temporary adjustments, measurement of horizontal angle by repetition method and reiteration method, measurement of vertical Angle, Trigonometrical leveling when base is accessible and inaccessible.

Traversing: Methods of traversing, traverse computations and adjustments, Introduction to Omitted measurements.

UNIT IV

Curves: Types of curves and their necessity, elements of simple, compound, reverse curves. Introduction to Tachometric Surveying.

Modern Surveying Methods: Principle and types of E.D.M. Instruments, Total station- advantages and Applications. Introduction to Global Positioning System. Introduction to Drone survey and LiDAR Survey (Light Detection and Ranging).

UNIT V Photogrammetry Surveying

Introduction, Basic concepts, perspective geometry of aerial photograph, relief and tilt displacements, terrestrial photogrammetry, flight planning; Stereoscopy, ground control extension for photographic mapping- aerial triangulation, radial triangulation, methods; photographic mapping- mapping using paper prints, mapping using stereo-plotting instruments, mosaics, map substitutes.

Text Books:

1 Surveying (Vol – 1 & 2) by Duggal S K, Tata McGraw Hill Publishing Co. Ltd. New Delhi, 5th edition, 2019.
2 Textbook of Surveying by C Venkatramaiah, Universities Press 1st Edition, 2011.

References:

1 Surveying (Vol–1), by B.C. Punmia, Ashok Kumar Jain and Arun Kumar Jain - Laxmi Publications (P) ltd., New Delhi, 18th edition 2024.
2 Surveying (Vol – 2), by B.C.Punmia, Ashok Kumar Jain and Arun Kumar Jain Laxmi Publications (P) ltd., New Delhi 17th 2022.
3 Surveying (Vol – 3), by B. C. Punmia, Ashok Kumar Jain and Arun Kumar Jain - LaxmiPublications (P) ltd., New Delhi 16th 2023
4 Plane Surveying and Higher Surveying‖ by Chandra A M, New age Internation1al Pvt. Ltd. Publishers, New Delhi, 3rd Edition, 2015.
5 Surveying and Levelling by N.Basak Tata McGraw Hill Publishing Co. Ltd. New Delhi, 4th edition, 2014.
6 Surveying (Vol 1, 2 & 3), by Arora K R, Standard Book House, Delhi. Edition: 12th, 2015.

DEPARTMENT OF CIVIL ENGINEERING

II	Year	I	Semester	L	T	P	C
Course Code:		BT24CE2102		3	0	0	3
STRENGTH OF MATERIALS							

Course Objectives: Students will learn

1. To impart Fundamental concepts of Strength of Material and Principles of Elasticity and Plasticity Stress
2. To impart concepts of shear force and bending moment on various types of beams and loading conditions
3. To impart concepts of stresses developed in the cross section and bending equations calculation of section modulus of sections with different cross sections.
4. To the concepts above will be utilized in measuring deflections in beams under various loading and support conditions.
5. To classify cylinders and columns based on their thickness and to derive equations for measurement of stresses across the cross section when subjected to external pressure

Course OutComes: At the end of the course, the student will be able to

CO	Statement	BL
CO1	To understand the basic materials behavior under the influence of different External loading conditions and the support conditions.	L2
CO2	To draw the diagrams indicating the variation of the key performance features like axial forces, bending moment and shear forces in structural members.	L3
CO3	To acquire knowledge of bending concepts and calculation of section modulus and for determination of stresses developed in the beams	L2
CO4	To analyze the deflections due to various loading conditions.	L3
CO5	To assess stresses across section of the thin, thick cylinders and columns to arrive at optimum sections to withstand the internal pressure using Lame's equation	L4

CO-PO Mapping:

CO/ PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO 9	PO 10	PO 11	PO 12
CO1	3	2	-	2	-	-	-	-	-	2	1	3
CO2	2	1	-	1	-	-	-	-	-	1	1	2
CO3	2	2	-	1	-	-	-	-	-	2	1	2
CO4	1	2	-	1	-	-	-	-	-	2	1	1
CO5	2	1	-	2	-	-	-	-	-	1	1	2
Mapping- 3: High; 2: Moderate; 1-Low												

CO/ PSO	PSO1	PSO2
CO1	3	3
CO2	3	3
CO3	3	2
CO4	3	3
CO5	3	2
CO6	3	3

Detailed Syllabus:

UNIT I Simple Stresses and Strains

Elasticity and plasticity - Types of stresses and strains - Hooke's law - Factor of safety, Poisson's ratio - Relationship between Elastic constants - Bars of varying section - stresses in composite bars.

UNIT II Shear Force and Bending Moment

Definition of beam - Types of beams - Concept of shear force and bending moment - Point of contra flexure - Relation between S.F., B.M and rate of loading at a section of a beam; S.F and B.M diagrams for cantilever, simply supported and overhanging beams subjected to point loads, uniformly distributed loads, uniformly varying loads, partial uniformly distributed loads, couple and combination of these loads.

UNIT III Flexural and Shear Stresses

Flexural Stresses: Theory of simple bending-Assumptions - Derivation of bending equation, Neutral axis - Determination of bending stresses - section modulus of rectangular and circular sections (Solid and Hollow), I, T, Angle and Channel sections - Design of simple beams

Shear Stresses: Derivation of formula - Shear stress distribution across various beam sections like rectangular, circular, I, T Angle sections.Torsion – circular shafts only.

UNIT IV Deflection of Beams

Double integration and Macaulay's methods — Determination of slope and deflection for cantilever, simply supported and overhanging beams subjected to point loads, uniformly distributed loads, uniformly varying loads, partial uniformly distributed loads, couple and combination of these loads. Mohr's theorems — Moment area method — application to simple cases of cantilever.

UNIT V Columns, Thin & Thick Cylinders

Introduction – Classification of columns – Axially loaded compression members – Euler's crippling load theory – Derivation of Euler's critical load formulae for various end conditions – Equivalent length – Slenderness ratio – Euler's critical stress – Limitations of Euler's theory – Rankine – Gordon formula – Eccentric loading and Secant formula – Prof. Perry's formula.

Thin and Thick cylindrical shells — Derivation of formula for longitudinal and circumferential stresses - hoop, longitudinal and volumetric strains — changes in diameter, and volume of thin cylinders. Lames theory for thick cylinders, Derivation of Lames formulae, distribution of hoop and radial stresses across the thickness, compound cylinders- distribution of stresses

Text Books:

1 Strength of Materials by R. K. Bansal, Lakshmi Publications, 16th Edition, 2022.
2 Strength of Materials by B. S. Basavarajaiah and P. Mahadevappa, Universities Press 3rd Edition, 2010
3 Strength of Materials by J.K. Gupta and S.K. Gupta, Cengage publications 2nd edition,2024

References:

1 Advanced Mechanics of Solids, L.S Srinath, McGraw Hill Education, 2017, 3rd Edition
2 Strength of Materials - Fundamentals and Applications, T.D.Gunneswara Rao and Mudim by Andal, Cambridge University Press, 2018, 1st Edition
3 Mechanics of Materials, Beer and Johnston, McGraw Hill India Pvt. Ltd., 2020, 8th Edition (SI Units).
4 Mechanics of Solids — E P Popov, Prentice Hall, 2nd Edition, 2015.
5 A Textbook of Strength of Materials, by R. K. Rajput, 7e (Mechanics of Solids) SI Units S. Chand & Co, New Delhi 7th edition 2022.
6 Strength of Materials by S.S.Ratan Tata McGill Publications 3rd Edition, 2016.

Online learning resources :

1. https://blog.tatanexarc.com/da/steel-bar-test/
2. https://cs-iitd.vlabs.ac.in/exp/bend-rebend/theory.html

DEPARTMENT OF CIVIL ENGINEERING

II	Year	I	Semester	L	T	P	C
Course Code:		BT24CE2103		3	0	0	3
FLUID MECHANICS							

Course Objectives: Students will learn

1. To explain basics of statics, kinematics and dynamics of fluids and various measuring techniques of hydrostatic forces on objects.
2. To impart ability to solve engineering problems in fluid mechanics
3. To enable the students measure quantities of fluid flowing in pipes, tanks and channels
4. To teach integral forms of fundamental laws of fluid mechanics to predict relevant pressures, velocities and forces.
5. To strengthen the students with fundamentals useful in application-intensive courses dealing with hydraulics, hydraulic machinery and hydrology in future courses.

Course Outcomes: At the end of the course, the student will be able to

CO	Statement	BL
CO1	Understand the principles of fluid statics, kinematics and dynamics	L2
CO2	Apply the laws of fluid statics and concepts of buoyancy	L3
CO3	Understand the fundamentals of fluid kinematics and differentiate types of fluid flows	L2
CO4	Apply the Principle of conservation of energy for flow measurement.	L3
CO5	Analyze the losses in pipes and discharge through pipe network.	L4

CO-PO Mapping:

CO/ PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	3	2	-	2	-	-	-	-	-	2	1	3
CO2	2	1	-	1	-	-	-	-	-	1	1	2
CO3	2	2	-	1	-	-	-	-	-	2	1	2
CO4	1	2	-	1	-	-	-	-	-	2	1	1
CO5	2	1	-	2	-	-	-	-	-	1	1	2
Level of Mapping- 3: High; 2: Moderate; 1-Low												

CO/ PSO	PSO1	PSO2
CO1	3	3
CO2	3	3
CO3	3	2
CO4	3	3
CO5	3	2

Detailed Syllabus:

UNIT I Basic concepts and definitions

Distinction between a fluid and a solid; Density, Specific weight, Specific gravity, Kinematic and dynamic viscosity; Variation of viscosity with temperature, Newton law of viscosity; Vapor pressure, Boiling point, Surface tension, Capillarity, Bulk modulus of elasticity, Compressibility

UNIT II Fluid statics

Fluid Pressure: Pressure at a point, Pascal's law, pressure variation with temperature, density and altitude. Piezometer, U-Tube Manometer, Single Column Manometer, U- Tube Differential Manometer. Pressure gauges, Hydrostatic pressure and force: horizontal, vertical and inclined surfaces. Buoyancy and stability of floating bodies

UNIT III Fluid kinematics

Classification of fluid flow: steady and unsteady flow; uniform and non-uniform flow; laminar and turbulent flow; rotational and irrotational flow; compressible and incompressible flow; ideal and real fluid flow; one-, two- and three-dimensional flows; Stream line, path line, streak line and stream tube; stream function, velocity potential function. One, two and three - Dimensional continuity equations in Cartesian coordinates.

UNIT IV Fluid Dynamics

Surface and body forces; Equations of motion - Euler's equation; Bernoulli's equation – Derivation; Energy Principle; Practical applications of Bernoulli's equation : Venturimeter, orifice meter and Pitot tube; Momentum principle; Forces exerted by fluid flow on pipe bend; Vortex Flow – Free and Forced; Definitions of Reynolds Number, Froude Number, Mach Number, Weber Number and Euler Number;

UNIT V Analysis Of Pipe Flow

Energy losses in pipelines; Darcy – Weisbach equation; Minor losses in pipelines; Hydraulic Grade Line and Total Energy Line; Concept of equivalent length – Pipes in Parallel and Series.

Text Books:

1 P. M. Modi and S. M. Seth, Hydraulics and Fluid Mechanics, Standard Book House 22nd, 2019.
2 K. Subrahmanya, Theory and Applications of Fluid Mechanics, Tata McGraw Hill, 2nd edition 2018

References:

1 R. K. Bansal, A text of Fluid mechanics and hydraulic machines, Laxmi Publications(P) Ltd., New Delhi 11th edition, 2024.
2 N. Narayana Pillai, Principles of Fluid Mechanics and Fluid Machines, Universities Press Pvt Ltd, Hyderabad. 3rd Edition 2009.
3 Fluid Mechanics by Frank M. White, Henry Xue, Tata McGraw Hill, 9th edition, 2022.
4 C. S. P. Ojha, R. Berndtsson and P. N. Chadramouli, Fluid Mechanics and Machinery, Oxford University Press, 2010.
5 Introduction to Fluid Mechanics & Fluid Machines by S K Som, Gautam Biswas, S Chakraborty Tata McGraw Hill, 3rd edition 2011

Online Learning Resources:

1 https://archive.nptel.ac.in/courses/112/105/112105269/
2 https://nptel.ac.in/courses/112104118
3 https://nptel.ac.in/courses/105103192

DEPARTMENT OF CIVIL ENGINEERING

II	Year	I	Semester	L	T	P	C
Course Code:		**BT24CE2104**		**0**	**0**	**3**	**1.5**
SURVEYING FIELD WORK							

Course Objectives: Students will learn

1. Know about various linear and angular measuring instruments
2. Take Measurements in the linear and angular view
3. Determine the area and volume by interpreting the data obtained from surveying activities
4. Know modern equipment such as total station
5. Draft field notes from survey data

Course OutComes: At the end of the course, the student will be able to

CO	Statement	BL
CO1	Handle various linear and angular measuring instruments	L2
CO2	Measure the linear and angular measurements	L3
CO3	Calculate the area and volume by interpreting the data obtained from surveying activities	L2
CO4	Handle modern equipment such as total station	L3
CO5	Prepare field notes from survey data	L4

CO-PO Mapping:

CO/ PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	2	2	-	2	1	-	-	-	3	2	2	2
CO2	2	2	-	2	1	-	-	-	3	3	3	2
CO3	2	2	-	2	1	-	-	-	3	2	2	2
CO4	1	2	-	-	3	-	-	-	3	2	2	1
CO5	2	1	-	-	-	-	-	-	3	2	2	1
Level of Mapping- 3: High; 2: Moderate; 1-Low												

CO/ PSO	PSO1	PSO2
CO1	2	-
CO2	2	-
CO3	2	-
CO4	1	-
CO5	1	-
CO6	2	-

List of Field Works:

S.No	Experiments
1	Chain survey of road profile with offsets in case of road widening.
2	Determination of distance between two inaccessible points by using compass.
3	Plane table survey ;finding the area of a given boundary by the method of Radiation
4	Fly levelling : Height of the instrument method (differential leveling)
5	Fly levelling: rise and fall method.
6	Theodolite survey: determining the horizontal and vertical angles by the method of repetition method
7	Theodolite survey: finding the distance between two in accessible points.
8	Theodolite survey: finding the height of far object.
9	Determination of area perimeter using total station.
10	Determination of distance between two inaccessible points by using total station.
11	Setting out a curve
12	Determining the levels of contours

References:

1. Surveying (Vol–1), by B.C. Punmia, Ashok Kumar Jain and Arun Kumar Jain - Laxmi Publications (P) ltd., New Delhi, 18th edition 2024.
2. Surveying (Vol – 2), by B.C.Punmia, Ashok Kumar Jain and Arun Kumar Jain Laxmi Publications (P) ltd., New Delhi 17th 2022.
3. Surveying (Vol – 3), by B. C. Punmia, Ashok Kumar Jain and Arun Kumar Jain - LaxmiPublications (P) ltd., New Delhi 16th 2023
4. Plane Surveying and Higher Surveying‖ by Chandra A M, New age Internation1al Pvt. Ltd. Publishers, New Delhi, 3rd Edition, 2015.

Online learning resources

1. https://surajjj2445.wordpress.com/wp-content/uploads/2014/09/surveying-lab-i-manual.pdf
2. https://arunprasadvarathan.blogspot.com/2014/10/survey-practical-1.html

DEPARTMENT OF CIVIL ENGINEERING

II	Year	I	Semester	L	T	P	C
Course Code:		BT24CE2105		0	0	3	1.5
STRENGTH OF MATERIALS LABORATORY							

Course Objectives: Students will learn

1. To determine the tensile strength and yield parameters of mild steel
2. To find out flexural strengths of Steel/Wood specimens and measure deflections
3. To determine the torsion parameters of mild steel bar
4. To determine the hardness numbers, impact and shear strengths of metals
5. To determine the load-deflection parameters for springs

Course OutComes: At the end of the course, the student will be able to

CO	Statement	BL
CO1	Evaluate the values of Tensile and compressive stresses of the given specimen.	L2
CO2	Analyze stress of various beams subjected to bending loads.	L3
CO3	Examine the stiffness of the open coil and closed coil spring.	L2
CO4	Evaluate the capacity of a material to withstand torsional and shearing stresses.	L3
CO5	Determine the hardness, impact strength to analyze the application of a specific material.	L4
CO6	Determine the of stress, strain, deformation of material under different types of loading.	L3

CO-PO Mapping:

CO/ PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	3	2	1	2	1	-	-	-	2	2	-	1
CO2	3	2	1	2	1	-	-	-	2	2	-	1
CO3	3	2	1	2	1	-	-	-	2	2	-	1
CO4	3	2	1	2	1	-	-	-	2	2	-	1
CO5	3	2	1	2	1	-	-	-	2	2	-	1
CO6	3	2	1	2	1	-	-	-	2	2	-	1
Level of Mapping- 3: High; 2: Moderate; 1-Low												

CO/ PSO	PSO1	PSO2
CO1	3	-
CO2	3	-
CO3	3	-
CO4	3	-
CO5	3	-
CO6	3	-

List of Experiments:

S.No	Experiments
1	Tension test on rebar
2	Bending test on (Steel/Wood) Cantilever beam.
3	Bending test on simply supported beam.
4	Torsion test on steel bars
5	Hardness test on steel bars
6	Compression test on Open coiled springs
7	Tension test on Closely coiled springs
8	Compression test on wood /concrete/bricks
9	Izod / Charpy Impact test on metals
10	Shear test on metals
11	Use of electrical resistance strain gauges.
12	Continuous beam – deflection test.

Reference Books:

1 Advanced Mechanics of Solids, L.S Srinath, McGraw Hill Education, 2017, 3rd Edition
2 Strength of Materials – Fundamentals and Applications, T.D.Gunneswara Rao and Mudim by Andal, Cambridge University Press, 2018, 1st Edition
3 Mechanics of Materials, Beer and Johnston, McGraw Hill India Pvt. Ltd., 2020, 8th Edition (SI Units).

Online learning resources :

1. https://blog.tatanexarc.com/da/steel-bar-test/
2. https://cs-iitd.vlabs.ac.in/exp/bend-rebend/theory.html

DEPARTMENT OF CIVIL ENGINEERING

II	Year	I	Semester	L	T	P	C
Course Code:		BT24CE2106		0	1	2	2
BUILDING PLANNING AND DRAWING							

Course Objectives: Students will learn

1. Initiating the student to different building bye-laws and regulations.
2. Imparting the planning aspects of residential buildings and public buildings.
3. Giving training exercises on various signs and bonds.
4. Giving training exercises on different building units.
5. Imparting the skills and methods of planning of various buildings.

Course OutComes: At the end of the course, the student will be able to

CO	Statement	BL
CO1	Plan various buildings as per the building by-laws.	L2
CO2	Distinguish the relation between the plan, elevation and cross section and identify the form and functions among the buildings.	L3
CO3	Draw signs and bonds	L2
CO4	Draw different building units	L3
CO5	Learn the skills of drawing building elements and plan the buildings as per requirements.	L4

CO-PO Mapping:

CO/ PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	1	1	2	-	-	3	3	2	-	2	2	2
CO2	1	1	2	-	-	3	2	-	-	2	1	1
CO3	1	1	2	-	-	3	3	2	-	2	2	2
CO4	1	1	2	-	-	3	3	2	-	2	2	2
CO5	1	1	2	-	-	3	3	2	-	2	2	2
Level of Mapping- 3: High; 2: Moderate; 1-Low												

CO/ PSO	PSO1	PSO2
CO1	3	3
CO2	-	2
CO3	3	3
CO4	3	3
CO5	3	3
CO6	3	3

List of Experiments:

S.No	Experiments
1	Detailing & Drawing of Sign Conventions.
2	Detailing & Drawing of English Bond.
3	Detailing & Drawing of Flemish Bond.
4	Detailing & Drawing of Doors.
5	Detailing & Drawing of Windows.
6	Detailing & Drawing of Ventilators & Roofs.
7	Drawing of Line Diagram of Residential Buildings by using Building Bye- Laws.
8	Drawing of Plan, Elevation & Section from line diagram for a single Storey Building.
9	Drawing of Plan, Elevation & Section for Hospital Building.
10	Drawing of Plan, Elevation & Section for Industrial Building.

Text Books:

1 Planning, designing and Scheduling, Gurcharan Singh and Jagdish Singh
2 Building planning and drawing by M. Chakraborty.
3 Building drawing, M G Shah, C M Kale and S Y Patki,Tata McGraw Hill, New Delhi.

References:

1 National Building Code 2016 (Volume- I & II).
2 Principles of Building Drawing, M G Shah and C M Kale, Trinity Publications, New Delhi.
3 Civil Engineering drawing and House planning, B. P. Verma, Khanna publishers, New Delhi.
4 Civil Engineering Building practice, Suraj Singh: CBS Publications, New Delhi, and Chennai
5 Building Materials and Construction, G. C Saha and Joy Gopal Jana, McGrawHill Education (P) India Ltd. New Delhi.

DEPARTMENT OF BASIC SCIENCE & HUMANITIES

II	Year	I	Semester	L	T	P	C
Course Code:		BT24BS2106		2	0	0	-
ENVIRONMENTAL SCIENCE							

Course Objectives: Students will learn

1. To make the students to get awareness on environment
2. To understand the importance of protecting natural resources, ecosystems for future generations and pollution causes due to the day-to-day activities of human life
3. To save earth from the inventions by the engineers

Course OutComes: At the end of the course, the student will be able to

CO	Statement	BL
CO1	Grasp multi-disciplinary nature of environmental studies and various renewable and non-renewable resources.	L2
CO2	Understand flow and bio-geo- chemical cycles and ecological pyramids.	L2
CO3	Understand various causes of pollution and solid waste management and related preventive measures.	L2
CO4	Understand the rainwater harvesting, watershed management, and ozone layer depletion and waste land reclamation.	L2
CO5	Illustrate the causes of population explosion, value education and welfare programs.	L3
CO6	Explain the importance of environment and human health.	

CO-PO Mapping:

CO/ PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	3	2	2	-	-	-	3	-	-	-	-	1
CO2	2	3	2	-	-	-	2	-	-	-	-	1
CO3	2	2	1	-	-	-	1	-	-	-	-	1
CO4	2	1	2	-	-	-	1	-	-	-	-	1
CO5	3	2	2	-	-	-	1	-	-	-	-	1
CO6	2	2	2	-	-	-	1	-	-	-	-	1
Level of Mapping- 3: High; 2: Moderate; 1-Low												

CO/ PSO	PSO1	PSO2
CO1	-	-
CO2	-	-
CO3	-	-
CO4	-	-
CO5	-	-
CO6	-	-

Detailed Syllabus:

UNIT I

Multidisciplinary Nature of Environmental Studies: – Definition, Scope and Importance – Need for Public Awareness.

Natural Resources : Renewable and non-renewable resources – Natural resources and associated problems – Forest resources – Use and over – exploitation, deforestation, case studies – Timber extraction – Mining, dams and other effects on forest and tribal people – Water resources – Use and over utilization of surface and ground water – Floods, drought, conflicts over water, dams – benefits and problems – Mineral resources: Use and exploitation, environmental effects of extracting and using mineral resources, case studies – Food resources: World food problems, changes caused by agriculture and overgrazing, effects of modern agriculture, fertilizer-pesticide problems, water logging, salinity, case studies. – Energy resources:

UNIT II

Ecosystems: Concept of an ecosystem. – Structure and function of an ecosystem – Producers, consumers and decomposers – Energy flow in the ecosystem – Ecological succession – Food chains, food webs and ecological pyramids – Introduction, types, characteristic features, structure and function of the following ecosystem: Forest ecosystem, Grassland ecosystem, Desert ecosystem, Aquatic ecosystems (ponds, streams, lakes, rivers, oceans, estuaries)

Biodiversity and Its Conservation: Introduction and Definition: genetic, species and ecosystem diversity – Bio-geographical classification of India – Value of biodiversity: consumptive use, Productive use, social, ethical, aesthetic and option values – Biodiversity at global, National and local levels – India as a mega-diversity nation – Hot-sports of biodiversity – Threats to biodiversity: habitat loss, poaching of wildlife, man-wildlife conflicts – Endangered and endemic species of India – Conservation of biodiversity: In-situ and Ex-situ conservation of biodiversity.

UNIT III

Environmental Pollution: Definition, Cause, effects and control measures of: Air Pollution, Water pollution, Soil pollution, Marine pollution, Noise pollution, Thermal pollution, Nuclear hazards

Solid Waste Management: Causes, effects and control measures of urban and industrial wastes – Role of an individual in prevention of pollution – Pollution case studies – Disaster management: floods, earthquake, cyclone and landslides.

UNIT IV

Social Issues and the Environment: From Unsustainable to Sustainable development – Urban problems related to energy – Water conservation, rain water harvesting, and watershed management – Resettlement and rehabilitation of people; its problems and concerns. Case studies

Environmental ethics: Issues and possible solutions – Climate change, global warming, acid rain, and ozone layer depletion, nuclear accidents and holocaust. Case Studies – Wasteland reclamation. – Consumerism and waste products. – Environment Protection Act. – Air (Prevention and Control of Pollution) Act. – Water (Prevention and control of Pollution) Act – Wildlife Protection Act – Forest Conservation Act – Issues involved in enforcement of environmental legislation – Public awareness.

UNIT V

Human Population And The Environment: Population growth, variation among nations. Population explosion – Family Welfare Programmes. – Environment and human health – Human Rights – Value Education – HIV/AIDS – Women and Child Welfare – Role of information Technology in Environment and human health – Case studies.

Fieldwork: Visit to a local area to document environmental assets River/forest grassland/hill/mountain – Visit to a local polluted site-Urban/Rural/Industrial/Agricultural Study of

common plants, insects, and birds – river, hill slopes, etc.

TextBooks:

1 Erach Bharucha, Text book of Environmental Studies for Undergraduate Courses, University Press (India) Private Limited, 2019.
2 Palaniswamy, Environmental Studies, 2/e, Pearson education, 2014.
3 S.Azeem Unnisa, Environmental Studies, Academic Publishing Company, 2021.
4 K.Raghavan Nambiar, "Text book of Environmental Studies for Undergraduate Courses as per UGC model syllabus", SciTech Publications (India), Pvt. Ltd, 2010.

Reference Books:

1 Deeksha Dave and E.SaiBaba Reddy,Textbook of Environmental Science, 2/e,Cengage Publications, 2012.
2 M.Anji Reddy, Textbook of Environmental Sciences and Technology, BS Publication, 2014.
3 J.P. Sharma, Comprehensive Environmental studies, Laxmi publications, 2006.
4 J. Glynn Henry and Gary W. Heinke, Environmental Sciences and Engineering, Prentice Hall of India Private limited, 1988.
5 G.R. Chatwal, A Text Book of Environmental Studies, Himalaya Publishing House, 2018.
6 Gilbert M. Masters and Wendell P. Ela, Introduction to Environmental Engineering and Science, 1/e, Prentice Hall of India Private limited, 1991.

Online Learning Resources:

1 https://onlinecourses.nptel.ac.in/noc23_hs155/preview
2 https://www.edx.org/learn/environmental-science/rice-university-ap-r-environmental-science-part-3- pollution-and-resources?index=product&objectID=course-3a6da9f2-d84c-4773-83881b2f8f6a75f2&
3 http://ecoursesonline.iasri.res.in/Courses/Environmental%20Science-I/Data%20Files/pdf/lec07.pdf https://www.youtube.com/watch?v=5QxxaVfgQ3k

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DR24

ENGINEERING CURRICULUM

W.e.f. 2024-25

II YEAR – II SEMESTER

B.Tech. (Regular-Full time)

(Effective for the students admitted into I year from
The Academic Year **2024-25** onwards)

DEPARTMENT OF BASIC SCIENCE & HUMANITIES

II	Year	II	Semester	L	T	P	C
Course Code:		BT24HS2201		2	0	0	2
MANAGERIAL ECONOMICS AND FINANCIAL ANALYSIS							

Course Objectives: Students will learn

1. To inculcate the basic knowledge of microeconomics and financial accounting
2. To make the students learn how demand is estimated for different products, input- output relationship for optimizing production and cost
3. To Know the Various types of market structure and pricing methods and strategy
4. To give an overview on investment appraisal methods to promote the students to learn how to plan long-term investment decisions.
5. To provide fundamental skills on accounting and to explain the process of preparing financial statements.

Course Outcomes: At the end of the course, the student will be able to

CO	Statement	BL
CO1	Define the concepts related to Managerial Economics, financial accounting and management	L2
CO2	Understand the fundamentals of Economics viz., Demand, Production, cost, revenue and markets	L2
CO3	Apply the Concept of Production cost and revenues for effective Business decision	L3
CO4	Analyze how to invest their capital and maximize returns	L4
CO5	Evaluate the capital budgeting techniques.	L5
CO6	Develop the accounting statements and evaluate the financial performance of business entity	L5

CO-PO Mapping:

CO/ PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	-	-	-	-	-	-	2	-	-	-	2	3
CO2	-	-	-	-	-	-	2	-	-	-	2	3
CO3	-	-	-	-	-	-	3	-	-	-	2	2
CO4	-	-	-	-	-	-	2	-	-	-	2	3
CO5	-	-	-	3	3	-	2	2	-	-	3	3
CO6	-	-	-	3	3	-	2	2	-	-	3	2
Level of Mapping- 3: High; 2: Moderate; 1-Low												

CO/ PSO	PSO1	PSO2
CO1	-	-
CO2	-	-
CO3	-	-
CO4	-	-
CO5	-	-
CO6	-	-

Detailed Syllabus:

UNIT I Managerial Economics

Introduction – Nature, meaning, significance, functions, and advantages. Demand-Concept, Function, Law of Demand - Demand Elasticity- Types – Measurement. Demand Forecasting-Factors governing Forecasting, Methods. Managerial Economics and Financial Accounting and Management.

UNIT II Production and Cost Analysis

Introduction – Nature, meaning, significance, functions and advantages. Production Function– Least- cost combination– Short run and long run Production Function- Isoquants and Is costs, Cost & Break- Even Analysis - Cost concepts and Cost behavior- Break-Even Analysis (BEA) - Determination of Break-Even Point (Simple Problems).

UNIT III Business Organizations and Markets

Introduction – Forms of Business Organizations- Sole Proprietary - Partnership - Joint Stock Companies- Public Sector Enterprises. Types of Markets - Perfect and Imperfect Competition - Features of Perfect Competition Monopoly- Monopolistic Competition– Oligopoly-Price-Output Determination - Pricing Methods and Strategies

UNIT IV Capital Budgeting

Introduction – Nature, meaning, significance. Types of Working Capital, Components, Sources of Short- term and Long-term Capital, Estimating Working capital requirements. Capital Budgeting– Features, Proposals, Methods and Evaluation. Projects – Pay Back Method, Accounting Rate of Return (ARR) Net Present Value (NPV) Internal Rate Return (IRR) Method (sample problems)

UNIT V Financial Accounting and Analysis

Introduction – Concepts and Conventions- Double-Entry Bookkeeping, Journal, Ledger, Trial Balance- Final Accounts (Trading Account, Profit and Loss Account and Balance Sheet with simple adjustments). Introduction to Financial Analysis - Analysis and Interpretation of Liquidity Ratios, Activity Ratios, and Capital structure Ratios and Profitability.

Text Books:

1 Varshney & Maheswari: Managerial Economics, Sultan Chand.
2 Aryasri: Business Economics and Financial Analysis, 4/e, MGH

Reference Books:

1 Ahuja Hl Managerial economics S chand.
2 S.A. Siddiqui and A.S. Siddiqui: Managerial Economics and Financial Analysis, New Age International.
3 Joseph G. Nellis and David Parker: Principles of Business Economics, Pearson, 2/e, New Delhi.
4 Domnick Salvatore: Managerial Economics in a Global Economy, Cengage.

Online Learning Resources:

1 https://www.slideshare.net/123ps/managerial-economics-ppt
2 https://www.slideshare.net/rossanz/production-and-cost-45827016
3 https://www.slideshare.net/darkyla/business-organizations-19917607

DEPARTMENT OF CIVIL ENGINEERING

II	Year	II	Semester	L	T	P	C
Course Code:		**BT24CE2201**		**3**	**0**	**0**	**3**
ENGINEERING GEOLOGY							

Course Objectives: Students will learn

1. To know the importance of Engineering Geology to the Civil Engineering.
2. To enable the students understand what minerals and rocks are and their formation and identification.
3. To highlight significance/ importance/ role of Engineering Geology in construction of Civil Engineering structures.
4. To enable the student realize its importance and applications of Engineering Geology in Civil Engineering constructions.
5. Concepts of Groundwater and its geophysical methods.

Course OutComes: At the end of the course, the student will be able to

CO	Statement	BL
CO1	Understand the significance of geological agents on Earth surface and its significance in Civil Engineering.	L2
CO2	Identify and understand the properties of Minerals and Rocks.	L2
CO3	Understand the concepts of Groundwater and its geophysical methods.	L3
CO4	Classify and measure the Earthquake prone areas, Landslides and subsidence to practice the hazard zonation.	L4
CO5	Investigate the project site for mega/mini civil engineering projects and site selection for mega engineering projects like Dams, Reservoirs and Tunnels.	L5

CO-PO Mapping:

CO/ PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	3	-	-	-	-	-	-	-	-	-	-	1
CO2	2	1	-	-	-	-	-	-	-	-	-	-
CO3	3	2	-	-	-	-	-	-	-	-	-	-
CO4	3	3	3	2	3	-	2	-	-	-	2	2
CO5	3	3	2	2	3	-	2	-	-	-	2	2
Level of Mapping- 3: High; 2: Moderate; 1-Low												

CO/ PSO	PSO1	PSO2
CO1	2	-
CO2	1	-
CO3	1	-
CO4	2	-
CO5	2	-
CO6	2	-

Detailed Syllabus:

UNIT I Introduction

Branches of Geology, Importance of Geology in Civil Engineering with case studies, weathering of rocks, Geological agents, weathering process of Rock, Rivers and geological work of rivers.

UNIT II Mineralogy And Petrology

Definitions of mineral and rock-Different methods of study of mineral and rock. Physical properties of minerals and rocks for megascopic study for the following minerals and rocks. Common rock forming minerals: Feldspar, Quartz Group, Olivine, Augite, Hornblende, Mica Group, Asbestos, Talc, Chlorite, Kyanite, Garnet, Calcite and ore forming minerals are Pyrite, Hematite, Magnetite, Chlorite, Galena, Pyrolusite, Graphite, Chromite, Magnetite and Bauxite. Classification, structures, textures and forms of Igneous rocks, Sedimentary rocks, Metamorphic rocks, and their megascopic study of granite varieties, (pink, gray, green). Pegmatite, Dolerite, Basalt etc., Shale, Sand Stone, Lime Stone, Laterite, Quartzite, Gneiss, Schist, Marble, Khondalite and Slate.

UNIT III Structural Geology

Strike , Dip and Outcrop study of common geological structures associating with the rocks such as Folds, Faults, Joints and Unconformities- parts, types, mechanism and their importance in Civil Engineering.

UNIT IV

Ground Water: Water table, Cone of depression, Geological controls of Ground Water Movement, Ground Water Exploration Techniques.

Earthquakes and Land Slides: Terminology, Classification, causes and effects, Shield areas and Seismic bells, Richter scale intensity, Precautions of building constructions in seismic areas. Classification of Landslides, Causes and Effects, measures to be taken prevent their occurrence at Landslides.

Geophysics: Importance of Geophysical methods, Classification, Principles of Geophysical study by Gravity method, Magnetic method, Electrical methods, Seismic methods, Radiometric method and Electrical resistivity, Seismic refraction methods and Engineering properties of rocks.

UNIT V Geology of Dams, Reservoirs and Tunnels:

Types and purpose of Dams, Geological considerations in the selection of a Dam site. Geology consideration for successful constructions of reservoirs, Life of Reservoirs. Purpose of Tunneling, effects, Lining of Tunnels. Influence of Geology for successful Tunneling.

Text Books:

1 Engineering Geology by N. ChennaKesavulu, Laxmi Publications. 2nd Edn 2014.
2 Engineering & General Geology by Parbin Singh Katson educational series 8th 2023

Reference Books:

1 Engineering Geology by Subinoy Gangopadhay Oxford University press 1st edition, 2012.
2 Engineering Geology by D. Venkat Reddy, Vikas Publishing, 2nd Edn, 2017,
3 Geology for Engineers and Environmental Society' Alan E Kehew, 3rd edn., 2013) Pearson publications.
4 'Environmental Geology' (2013) K.S.Valdiya, 2nd ed., McGraw Hill Publications.

Online Learning Resources:

1 http://nptel.iitm.ac.in/video.php?subjectId=105105106
2 http://nptel.iitm.ac.in/video.php?courseId=1055&p=1
3 http://nptel.iitm.ac.in/video.php?courseId=1055&p=3
4 http://nptel.iitm.ac.in/video.php?courseId=1055&p=4

DEPARTMENT OF CIVIL ENGINEERING

II	Year	II	Semester	L	T	P	C
Course Code:		BT24CE2202		3	0	0	3
CONCRETE TECHNOLOGY							

Course Objectives: Students will learn

1. Learn materials and their properties used in the production of concrete
2. Learn the behavior of concrete at fresh stage
3. Learn the behavior of concrete at hardened stage
4. Learn the influence of elasticity, creep and shrinkage on concrete
5. Learn the mix design methodology and special concretes

Course Outcomes: At the end of the course, the student will be able to

CO	Statement	BL
CO1	Familiarize the basic ingredients of concrete and their role in the production of concrete and its behaviour in the field	L2
CO2	Test the fresh concrete properties and the hardened concrete properties. Understand the basic concepts of concrete. Design the concrete mix by BIS method.	L2
CO3	Evaluate the ingredients of concrete through lab test results, realize the importance of quality of concrete	L3
CO4	Understand the behaviour of concrete in various environments.	L4
CO5	Familiarize the basic concepts of special concrete and their production and applications.	L5

CO-PO Mapping:

CO/ PO	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12
CO1	3	2	-	-	-	2	2	-	-	-	-	-
CO2	3	3	2	-	2	-	2	-	-	-	2	-
CO3	3	2	3	-	2	-	2	-	-	-	-	-
CO4	3	2	-		3	2	-	-	-	2	3	-
CO5	3	3	2	-	2	2	-	2	-	-	2	-
Level of Mapping- 3: High; 2: Moderate; 1-Low												

CO/ PSO	PSO1	PSO2
CO1	3	-
CO2	3	-
CO3	3	-
CO4	-	-
CO5	-	-
CO6	3	-

Detailed Syllabus:

UNIT I CEMENTS & AGGREGATES

CEMENTS: Portland cement – Chemical composition – Hydration, Setting of cement, Fineness of cement, Structure of hydrate cement – Test for physical properties – Different grades of cements – Admixtures – Mineral and chemical admixtures – accelerators, retarders, air Entrainers, Plasticizers, super Plasticizers, fly ash and silica fume

AGGREGATES: Classification of aggregate – Particle shape & texture – Bond, strength & other mechanical properties of aggregates – Specific gravity, Bulk density, porosity, adsorption & moisture content of aggregate – Bulking of sand –Deleterious substances – Soundness – Alkali aggregate reaction – Thermal properties – Sieve analysis – Fineness modulus – Grading curves – Grading of fine & coarse Aggregates – Maximum aggregate size- Quality of mixing water.

UNIT II FRESH CONCRETE

Steps in Manufacture of Concrete–proportion, mixing, placing, compaction, finishing, curing – including various types in each stage. Properties of fresh concrete- Workability – Factors affecting Workability – Measurement of Workability by different tests, Setting times of concrete, Effect of time and temperature on Workability – Segregation & bleeding – Mixing and vibration of concrete, Ready mixed concrete, Shotcrete.

UNIT III HARDENED CONCRETE

Water / Cement ratio – Abram's Law – Gel/space ratio – Nature of strength of concrete –Maturity concept – Strength in tension & compression – Factors affecting strength – Relation between compression & tensile strength – Curing, Testing of Hardened Concrete: Compression test – Tension test – Factors affecting strength – Flexure test –Splitting test –Non-destructive testing methods – Codal provisions for NDT.

UNIT IV ELASTICITY, CREEP & SHRINKAGE

Modulus of elasticity – Dynamic modulus of elasticity – Poisson's ratio – Creep of concrete – Factors influencing creep – Relation between creep & time – Nature of creep – Effects of creep – Shrinkage –types of shrinkage.

UNIT V MIX DESIGN AND SPECIAL CONCRETES

Fibre reinforced concrete – Different types of fibers – Factors affecting properties of FRC, High performance concrete – Self consolidating concrete, Self-healing concrete. Factors in the choice of mix proportions –Quality control of concrete- Statistical methods- Acceptance Criteria-Concepts Proportioning of concrete mixes by ACI method and IS Code method

Text Books:

1 Properties of Concrete by A.M. Neville – PEARSON – 4th edition
2 Concrete Technology by M.L. Gambhir. – Tata Mc.Graw Hill Publishers, New Delhi 5th edition 2013.
3 Concrete Technology by Job Thomas, Cengagae Publications, 1st edition, 2015

Reference Books:

1 Concrete Microstructure, Properties of Materials by P.K. Mehta and Moterio. McGraw Hill 4th edition 2014
2 Concrete Technology, J.J. Brooks and A. M. Neville, Pearson, 2019, 2nd Edition.
3 Concrete Technology by M. S. Shetty. – S. Chand & Co.; 2004
4 Concrete Technology by A.R. Santha Kumar, Oxford University Press, New Delhi

Online learning resources :

1.https://www.youtube.com/watch?v=cx5gPKp9QEc&list=PLbMVogVj5nJQU7M0LdA77p_XaaWBJniNc
2.https://www.youtube.com/watch?v=6ju8mig4VoU&list=PLbMVogVj5nJT6RXK4VKPGOfWHp2ZH8xin
3. https://www.youtube.com/watch?v=227GcdVxWVQ

DEPARTMENT OF CIVIL ENGINEERING

II	Year	II	Semester	L	T	P	C
Course Code:		BT24CE2203		3	0	0	3
STRUCTURAL ANLAYSIS							

Course Objectives: Students will learn

1. Learn energy theorems
2. Learn the analysis of indeterminate structures
3. Analysis of fixed and continuous beams
4. Learn about slope-deflection method
5. Learn about Moment – distribution method

Course Outcomes: At the end of the course, the student will be able to

CO	Statement	BL
CO1	Apply energy theorems to analyze trusses	L2
CO2	Analyze indeterminate structures by using Castigliano's–II theorem	L2
CO3	Analysis of fixed and continuous beams	L3
CO4	Analyze continuous beams and portal frames by using slope-deflection method	L4
CO5	Analyze continuous beams and portal frames by using Moment – distribution method	L5

CO-PO Mapping:

CO/ PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	2	2	-	-	-	-	-	-	-	-	-	-
CO2	3	3	2	-	3	-	-	-	-	-	-	-
CO3	3	3	2	-	3	-	-	-	-	-	-	-
CO4	3	3	-	-	-	-	-	-	-	-	-	-
CO5	3	3	-	-	-	-	-	-	-	-	-	-
Level of Mapping- 3: High; 2: Moderate; 1-Low												

CO/ PSO	PSO1	PSO2
CO1	2	-
CO2	-	-
CO3	3	3
CO4	3	3
CO5	3	3
CO6	2	-

Detailed Syllabus:

UNIT I ENERGY THEOREMS

Introduction-Strain energy in linear elastic system, expression of strain energy due to axial load, bending moment and shear forces – Castigliano‘s first theorem ,Deflections of simple beams and pin jointed trusses.

UNIT II ANALYSIS OF INDETERMINATE STRUCTURES:

Indeterminate Structural Analysis – Determination of static and kinematic indeterminacy – Solution of trusses with up-to two degrees of internal and external indeterminacy – Castigliano's‘s–II theorem.

UNIT III FIXED BEAMS & CONTINUOUS BEAMS

Introduction to statically indeterminate beams with uniformly distributed load, central point load, eccentric point load, number of point loads, uniformly varying load, couple and combination of loads – Shear force and Bending moment diagrams – Deflection of fixed beams effect of sinking of support, effect of rotation of a support-Calpeyron's Theorem of Three Moments for the analysis of continuous beams.

UNIT IV SLOPE-DEFLECTION METHOD

Introduction-derivation of slope deflection equations- application to continuous beams with and without settlement of supports - Analysis of single bay portal frames without sway.

UNIT V MOMENT DISTRIBUTION METHOD

Introduction to moment distribution method- Application to continuous beams with and without settlement of supports-Analysis of single bay storey portal frames without sway.

Text Books:

1 Analysis of Structures – Vol-I & II by V.N.Vazirani & M.M.Ratwani, Khanna Publications, New Delhi.
2 Basic Structural Analysis by C.S.Reddy., Tata McGraw Hill Publishers. 3rd edition 2017.

Reference Books:

1 Structural analysis by Aslam Kassimali Cengage publications 6th edition 2020.
2 Structural analysis Vol. I and II by Dr.R.Vaidyanathan and Dr.PPerumal– Laxmi publications. 3rd 2016
3 Introduction to structural analysis by B.D.Nautiyal, New Age international publishers, New Delhi.
4 Structural Analysis – D.S.Prakasarao -Univeristy press.
5 Strength of Materials and Mechanics of Structures by B.C.Punmia, Khanna Publications, New Delhi

Online learning resources :

1. https://archive.nptel.ac.in/courses/105/105/105105166/
2. https://drive.google.com/file/d/1sd563RgHeTiwKp0CYaHC5FV43M3RANPS/view

DEPARTMENT OF CIVIL ENGINEERING

II	Year	II	Semester	L	T	P	C
Course Code:		BT24CE2204		3	0	0	3
HYDRAULICS AND HYRAULIC MACHINERY							

Pre-requisite: Fluid Mechanics

Course Objectives: Students will learn

1 To Introduce concepts of laminar and turbulent flows
2 To teach principles of uniform flows through open channel.
3 To teach principles of non-uniform flows through open channel.
4 To impart knowledge on design of turbines.
5 To impart knowledge on design of pumps

Course OutComes: At the end of the course, the student will be able to

CO	Statement	BL
CO1	Understand the characteristics of laminar and turbulent flows.	L2
CO2	Apply the knowledge of fluid mechanics to address the uniform flow problems in open channels.	L3
CO3	Solve non-uniform flow problems and hydraulic jump phenomenon in open channel flows.	L3
CO4	Evaluate the performance of impact of jets on plates and design Pelton wheel, Francis and Kaplan turbine	L5
CO5	Understand the principles, losses and its efficiencies of centrifugal pumps	L2

CO-PO Mapping:

CO/ PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	3	2	-	-	-	2	-	-	-	-	2	-
CO2	3	3	-	-	-	3	-	-	-	-	3	-
CO3	3	3	-	-	-	3	-	-	-	-	3	-
CO4	3	3	-	-	-	3	-	-	-	-	3	-
CO5	3	2	-	-	-	2	-	-	-	-	2	-
Level of Mapping- 3: High; 2: Moderate; 1-Low												

CO/ PSO	PSO1	PSO2
CO1	3	1
CO2	3	2
CO3	3	2
CO4	3	3
CO5	3	2
CO6	3	1

Detailed Syllabus:

UNIT I Laminar & Turbulent flow in pipes

Laminar Flow- Laminar flow through: circular pipes, annulus and parallel plates. Stoke‘s law, Measurement of viscosity. Reynolds experiment, Transition from laminar to turbulent flow. Resistance to flow of fluid in smooth and rough pipes-Moody‘s diagram – Introduction to boundary layer theory.

UNIT II Uniform flow in Open Channels

Open Channel Flow - Comparison between open channel flow and pipe flow, geometrical parameters of a channel, classification of open channels, classification of open channel flow, Velocity Distribution of channel section. Hydraulically efficient channel sections: Rectangular, trapezoidal and triangular channels, Energy and Momentum correction factors

UNIT III Non-Uniform flow in Open Channels

Specific energy, critical flow, discharge curve, Specific force, Specific depth, and Critical depth. Measurement of Discharge and Velocity – Gradually Varied Flow- Dynamic Equation of Gradually Varied Flow. Hydraulic Jump and classification - Elements and characteristics- Energy dissipation.

UNIT IV Impact of Jets

Hydrodynamic force of jets on stationary and moving flat, inclined and curved vanes - Velocity triangles at inlet and outlet - Work done and efficiency Hydraulic Turbines: Classification of turbines; Pelton wheel and its design. Francis turbine and its design - efficiency - Draft tube: theory - characteristic curves of hydraulic turbines. Cavitation: causes and effects.

UNIT V Pumps

Working principles of a centrifugal pump, work done by impeller; heads, losses and efficiencies; minimum starting speed; Priming; specific speed; limitation of suction lift, net positive suction head (NPSH); Performance and characteristic curves; Cavitation effects; Multistage centrifugal pumps; troubles and remedies

Text Books:

1 P. M. Modi and S. M. Seth, Hydraulics and Fluid Mechanics, Standard Book House 22nd, 2019.
2 K. Subrahmanya, Theory and Applications of Fluid Mechanics, Tata McGraw Hill, 2nd edition 2018

Reference Books:

1 R. K. Bansal, A text of Fluid mechanics and hydraulic machines, Laxmi Publications (P) Ltd., New Delhi 11th edition, 2024.
2 Fluid Mechanics by Frank M. White, Henry Xue, Tata McGraw Hill, 9th edition, 2022.
3 C. S. P. Ojha, R. Berndtsson and P. N. Chadramouli, Fluid Mechanics and Machinery, Oxford University Press, 2010.
4 Introduction to Fluid Mechanics & Fluid Machines by S K Som, Gautam Biswas, S Chakraborty 3rd edition 2011

Online Learning Resources:

1 https://nptel.ac.in/courses/105105203
2 https://archive.nptel.ac.in/courses/112/106/112106300/
3 https://archive.nptel.ac.in/courses/112/103/112103249/

DEPARTMENT OF CIVIL ENGINEERING

II	Year	II	Semester	L	T	P	C
Course Code:		BT24CE2205		0	0	3	1.5
CONCRETE TECHNOLOGY LABORATORY							

Course Objectives: Students will learn

1 Test basic properties of ingredients of concrete fresh and hardened concrete properties

Course OutComes: At the end of the course, the student will be able to

CO	Statement	BL
CO1	Outline importance of testing cement and its properties	L2
CO2	Assess different properties of Aggregates	L2
CO3	Assess fresh concrete properties and their relevance to hardened concrete	L3
CO4	Assess hardened concrete properties	L4
CO5	Describe the preparation of green concrete	L5
CO6	Outline the importance of testing of cement and its properties	L3

CO-PO Mapping:

CO/ PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	3	2	1	-	2	2	1	-	-	-	-	-
CO2	3	2	1	2	2	-	-	-	-	-	-	-
CO3	2	2	-	-	-	-	-	-	-	-	-	-
CO4	3	2	-	-	-	2	-	-	-	2	-	-
CO5	2	2	2	-	1	-	-	-	-	2	-	-
CO6	3	2	1	-	1	-	-	-	-	1	-	-
Level of Mapping- 3: High; 2: Moderate; 1-Low												

CO/ PSO	PSO1	PSO2
CO1	2	-
CO2	2	-
CO3	3	-
CO4	2	-
CO5	3	-
CO6	3	-

List of Experiments:

S.No	Experiment
Tests on Cement	
1	Normal Consistency and Fineness of cement.
2	Initial setting time and Final setting time of cement.
3	Specific gravity and soundness of cement.
4	Compressive strength of cement.
Tests on Fine Aggregates	
5	Grading and Fineness modulus of Fine aggregate by sieve analysis.
6	Specific gravity of fine aggregate
7	Water Absorption and Bulking of sand.
Tests on Coarse Aggregates	
8	Grading of Coarse aggregate by sieve analysis.
9	Specific gravity of coarse aggregate
10	Water Absorption of Coarse aggregates
Tests on Fresh Concrete	
11	Workability of concrete by Compaction Factor method
12	Workability of concrete by Slump test
13	Workability of concrete by Vee-bee test
Tests on Hardened Concrete	
14	Determine Compressive strength, Modulus of Rupture, Young's Modulus and Poisson's Ratio of Concrete
15	Split tensile strength of concrete.
16	Non-Destructive testing on concrete (for demonstration)

Reference books:

1.Concrete Microstructure, Properties of Materials by P.K. Mehta and Moterio. McGraw Hill 4th edition 2014
2.Concrete Technology, J.J. Brooks and A. M. Neville, Pearson, 2019, 2nd Edition.

Online learning resources :

1.https://www.youtube.com/watch?v=cx5gPKp9QEc&list=PLbMVogVj5nJQU7M0LdA77p_XaaWBJniNc
2.https://www.youtube.com/watch?v=6ju8mig4VoU&list=PLbMVogVj5nJT6RXK4VKPGOfWHp2ZH8xin
3. https://www.youtube.com/watch?v=227GcdVxWVQ

DEPARTMENT OF CIVIL ENGINEERING

II	Year	II	Semester	L	T	P	C
Course Code:		BT24CE2206		0	0	3	1.5
ENGINEERING GEOLOGY LABORATORY							

Course Objectives: Students will learn

1 To identify the Megascopic types of Ore minerals & Rock forming minerals.
2 To identify the Megascopic types of Igneous, Sedimentary, Metamorphic rocks.
3 To identify the topography of the site & material selection

Course OutComes: At the end of the course, the student will be able to

CO	Statement	BL
CO1	Identify Megascopic minerals & their properties.	L2
CO2	Identify Megascopic rocks & their properties.	L2
CO3	Identify the site parameters such as contour, slope & aspect for topography.	L3
CO4	Know the occurrence of materials using the strike & dip problems.	L4
CO5	Understand the properties of rocks which influences the quality of structure	L2

CO-PO Mapping:

CO/ PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	2	2	-	-	-	-	-	-	-	-	-	-
CO2	2	1	-	-	-	-	-	-	-	-	-	-
CO3	1	3	3	-	-	-	-	-	-	2	3	-
CO4	3	-	-	-	-	-	-	-	-	-	-	-
CO5	3	2	3	-	-	2	-	-	-	-	3	-
Level of Mapping- 3: High; 2: Moderate; 1-Low												

CO/ PSO	PSO1	PSO2
CO1	2	-
CO2	1	-
CO3	1	-
CO4	2	-
CO5	2	-

List of Experiments:

S.No	Experiment
1	**a) Physical properties of minerals: Mega-scopic identification of**
	b) Rock forming minerals – Quartz group, Feldspar group, Garnet group, Mica group & Talc, Chlorite, Olivine, Kyanite, Asbestos, Tourmelene, Calcite, Gypsum, etc.
	c) Ore forming minerals – Magnetite, Hematite, Pyrite, Pyralusite, Graphite, Chromite, etc.
2	**Mega-scopic description and identification of rocks.**
	a) Igneous rocks – Types of Granite, Pegmatite, Gabbro, Dolerite, Syenite, Granite Poryphery, Basalt, etc.
	b) Sedimentary rocks – Sand stone, Ferruginous sand stone, Lime stone, Shale, Laterite, Conglamorate, etc.
	c) Metamorphic rocks – Biotite – Granite, Gneiss, Slate, Muscovite & Biotite schist, Marble, Khondalite, etc.
3	Interpretation and drawing of sections for geological maps showing tilted beds,faults, unconformities etc.
4	Simple Structural Geology problems.
5	Bore hole data.
6	Strength of the rock using laboratory tests.
7	Field work – To identify Minerals, Rocks, Geomorphology& Structural Geology.

Lab Examination Pattern:

1. Description and identification of FOUR minerals\
2. Description and identification of FOUR (including igneous, sedimentary and metamorphic rocks)
3. ONE Question on Interpretation of a Geological map along with a geological section.
4. TWO Questions on Simple strike and Dip problems.
5. Bore hole problems.
6. Project report on geology.

References:

1. 'Applied Engineering Geology Practicals' by M T Mauthesha Reddy, New Age International Publishers, 2nd Edition.
2. 'Foundations of Engineering Geology' by Tony Waltham, Spon Press, 3rd edition, 2009.

Online learning resources :

1. https://www.youtube.com/watch?v=ExFXga81iWQ
2. https://www.youtube.com/watch?v=A11b6tORIcM
3. https://www.geos.iitb.ac.in/index.php/gp-519-engineering-and-groundwater-geology-lab/

DEPARTMENT OF CIVIL ENGINEERING

II	Year	II	Semester	L	T	P	C
Course Code:		BT24CE2207		0	1	2	2
REMOTE SENSING AND GEOGRAPHICAL INFORMATION SYSTEMS							

Course Objectives: Students will learn

1. Introduce the basic principles of Remote Sensing and GIS techniques and its application to Civil Engineering.
2. Learn various types of sensors and platforms and understand the principles of spatial analysis techniques in GIS.
3. Introduce GIS software to understand the process of digitization, creation of thematic map from toposheets and maps.

Course OutComes: At the end of the course, the student will be able to

CO	Statement	BL
CO1	Acquire knowledgeabout concepts of remote sensing, sensors and . their characteristics.	L2
CO2	Familiarize with data models and data structures to introduce various Raster and Vector Analysis capabilities in GIS.	L3
CO3	Digitize and create thematic map and extract important features to calculate geometry.	L3
CO4	Perform surface analysis over Contour to develop digital elevation model.	L5
CO5	Use GIS software to perform simple analysis in water resources and transportation engineering.	L2

CO-PO Mapping:

CO/ PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	2	-	1	1	-	-	2	-	-	-	-	2
CO2	2	-	1	1	-	-	2	-	-	-	-	2
CO3	1	2	2	1	2	2	3	-	2	2	1	3
CO4	1	2	2	1	2	2	3	-	2	2	1	3
CO5	1	2	2	1	2	2	3	-	2	2	1	3
Level of Mapping- 3: High; 2: Moderate; 1-Low												

CO/ PSO	PSO1	PSO2
CO1	-	1
CO2	1	3
CO3	3	3
CO4	3	3
CO5	3	3

Detailed Syllabus:

UNIT I Introduction to Remote Sensing

History of Remote Sensing, Electromagnetic Radiation, Electromagnetic Spectrum, Energy Interaction with Atmosphere, Energy Interaction with the Earth Surfaces - Characteristics of Remote Sensing Systems, Sensor Resolutions, Advantages & Limitations - Platforms: Types of Sensors, Airborne Remote Sensing, Spaceborne Remote Sensing - IRS, LANDSAT, SPOT & Recent satellite.

UNIT II Digital Image Analysis

Digital Image Characteristics, Digital Image Data Formats, Band Interleaved by Pixel (BIP), Band Interleaved by Line (BIL), Band Sequential (BSQ) - Visual Interpretation Elements, Preprocessing, Enhancement, Classification, Supervised classification, Unsupervised classification.

UNIT III Introduction to Geographic Information System:

Principles, Components and Applications of GIS - Map projections, Spatial Data Structures, Raster and Vector Data Formats, Data Inputs, Data Manipulation, Data Retrieval, Data Analysis - Spatial data analysis: Overlay Function-Vector Overlay Operations, Raster Overlay Operations, Arithmetic Operators, Comparison and Logical Operators, Conditional Expressions - Network Analysis: Components of network, Transportation network - Optimum path analysis.

Text Books:

1 Basudeb Bhatta (2021). 'Remote sensing and GIS', 3rd edn., Oxford University Press.
2 S. Kumar, (2016) 'Basics of Remote sensing & GIS', Laxmi Publications.
3 Lillesand, T.M, R.W. Kiefer and J.W. Chipman (2022) 'Remote Sensing and Image Interpretation', 7th edn., Wiley India Pvt. Ltd.
4 Demers, M.N, (2013) 'Fundamentals of Geographic Information Systems', 4th edn., Wiley India Pvt. Ltd.

List of Experiments:

S.No	Experiments
1	Georeferencing a Topo sheet or Map
2	Digitization and Attribute table creation
3	Creation of Thematic Map
4	Calculation of Feature geometry – Length, Area & Perimeter.
5	Contour map – developing TIN & DEM from Contour.
6	Stream network – Stream ordering map.
7	Watershed - calculate Hydro-geomorphological parameters.
8	Transportation Network Map – Route analysis.

GIS Software: QGIS / Arc GIS

Textbook for practical

1 QGIS User Guide
2 Arc GIS User Manual by ESRI

References:

1 Schowengerdt, R. A (2006) 'Remote Sensing', Elsevier publishers.
2 Burrough P A and R.A. McDonnell, (1998) 'Principals of Geographical Information Systems', Oxford University Press.
3 George Joseph (2013) 'Fundamentals of Remote Sensing', Universities Press.

Web References:

1 https://nptel.ac.in/courses/10510319

DEPARTMENT OF MECAHNICAL ENGINEERING

II	Year	II	Semester	L	T	P	C
Course Code:		BT24ME2207		1	0	2	2
DESIGN THINKING & INNOVATION							

Course Objectives: Students will learn

1. Bring awareness on innovative design and new product development.
2. Explain the basics of design thinking.
3. Familiarize the role of reverse engineering in product development.
4. Train how to identify the needs of society and convert into demand.
5. Introduce product planning and product development process.

Course OutComes: At the end of the course, the student will be able to

CO	Statement	BL
CO1	Define the concepts related to design thinking.	L1
CO2	Explain the fundamentals of Design Thinking and innovation.	L2
CO3	Apply the design thinking techniques for solving problems in various sectors.	L3
CO4	Analyze to work in a multidisciplinary environment.	L4
CO5	Evaluate the value of creativity.	L5

CO-PO Mapping:

CO/ PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	3	3	3	-	2	3	-	-	-	-	-	-
CO2	3	3	1	-	2	2	-	-	-	-	-	3
CO3	3	3	2	3	-	3	2	3	3	-	-	2
CO4	3	3	3	2	3	2	3	-	-	-	-	3
CO5	3	3	2	-	3	2	-	-	-	3	-	-
Level of Mapping- 3: High; 2: Moderate; 1-Low												

CO/ PSO	PSO1	PSO2
CO1	3	-
CO2	3	-
CO3	3	-
CO4	3	-
CO5	3	-

Detailed Syllabus:

UNIT I Introduction to Design Thinking

Introduction to elements and principles of Design, basics of design-dot, line, shape, form as fundamental design components. Principles of design. Introduction to design thinking, history of Design Thinking, New materials in Industry.

UNIT II Design Thinking Process

Design thinking process (empathize, analyze, idea & prototype), implementing the process in driving inventions, design thinking in social innovations. Tools of design thinking - person, costumer, journey map, brainstorming, product development

Activity: Every student presents their idea in three minutes, Every student can present design process in the form of flow diagram or flow chart etc. Every student should explain about product development.

UNIT III Innovation

Art of innovation, Difference between innovation and creativity, role of creativity and innovation in organizations. Creativity to Innovation. Teams for innovation, Measuring the impact and value of creativity.

Activity: Debate on innovation and creativity, Flow and planning from idea to innovation, Debate on value-based innovation.

UNIT IV Product Design

Problem formation, introduction to product design, Product strategies, Product value, Product planning, product specifications. Innovation towards product design Case studies.

Activity: Importance of modeling, how to set specifications, Explaining their own product design.

UNIT V Design Thinking in Business Processes

Design Thinking applied in Business & Strategic Innovation, Design Thinking principles that redefine business – Business challenges: Growth, Predictability, Change, Maintaining Relevance, Extreme competition, Standardization. Design thinking to meet corporate needs. Design thinking for Startups. Defining and testing Business Models and Business Cases. Developing & testing prototypes.

Activity: How to market our own product, about maintenance, Reliability and plan for startup.

TEXTBOOK:

1 Tim Brown, Change by design, 1/e, Harper Bollins, 2009.
2 Idris Mootee, Design Thinking for Strategic Innovation, 1/e, Adams Media, 2014.

Reference Books:

1 David Lee, Design Thinking in the Classroom, Ulysses press, 2018.
2 Shrrutin N Shetty, Design the Future, 1/e, Norton Press, 2018.
3 William lidwell, Kritinaholden, &Jill butter, Universal principles of design, 2/e, Rockport Publishers, 2010.
4 Chesbrough.H, The era of open innovation, 2003.

Online Learning Resources:

1 https://nptel.ac.in/courses/110/106/110106124/
2 https://nptel.ac.in/courses/109/104/109104109/
3 https://swayam.gov.in/nd1_noc19_mg60/preview
4 https://onlinecourses.nptel.ac.in/noc22_de16/preview

Website: www.jntuk.edu.in
E-mail: registrar@jntuk.edu.in

Phone: Off: 0884-2300900
Fax: 0884-2300901

28 JAN 2025 JNTUK OFFICE KAKINADA-533003, A.P.

PROCEEDINGS OF THE
JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY: KAKINADA
Kakinada-533003, Andhra Pradesh (India)

Proc. No. JNTUK/DAP/Evaluation Procedure for DT&I/Approval/2025 Date: 27.01.2025

Sub: DAP – Academic Planning – Evaluation Procedure for Design Thinking and Innovation (L-T-P-C) (1-0-2-2) - Orders - Issued.

Read: e-Office No. 2690537 approved by Honourable Vice Chancellor dated 27.01.2025

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ORDER:

With reference cited above, the Honorable Vice Chancellor, JNTUK is pleased to approve the recommendations for Evaluation Procedure for Design Thinking and Innovation (L-T-P-C) (1-0-2-2) as follows:

Evaluation Procedure for Design Thinking and Innovation (L-T-P-C) (1-0-2-2):

The performance of a student **for Design Thinking and Innovation** shall be evaluated with a maximum of 100 marks.
A student has to secure not less than 35% of marks in the end examination and a minimum of 40% of marks in the sum total of the mid semester and end examination marks taken together.

Assessment Method	Marks
Internal Assessment	30
Semester End Examination	70
Total	**100**

The distribution shall be 30 marks for Internal Evaluation and 70 marks for the End-Examination.

a) **Internal Evaluation Procedure**

i) **Of the internal marks of 30, Day to Day Evaluation in the lab will be given a maximum of 7.5 Marks (25%) and Mid Exam(theory), a maximum of 22.5 Marks (75%).**

ii) During the semester, there shall be two midterm examinations. Each midterm examination shall be evaluated for 30 marks of which 10 marks for objective paper (20 minutes duration), 15 marks for subjective paper (90 minutes duration) and 5 marks for assignment. **30 Marks will be scaled down to 22.5 Marks.**

a. Objective paper shall contain for 05 short answer questions with 2 marks each OR maximum of 20 bits for 10 marks.
b. Subjective paper shall contain 3 questions of internal choice (i.e., either-or type questions of which student has to answer one from each either-or type of questions, each question carries 10 marks. The marks obtained in the subjective paper are condensed to 15 marks.
c. 5 marks for assignment
d. Mid examinations of Design thinking and Innovation to be conducted by the corresponding college.

Note:

- The subjective paper shall contain 3 either-or type questions of equal weightage of 10 marks. Any fraction shall be rounded off to the next higher mark.
- Assignments shall be in the form of problems, mini projects, design problems, slip tests, quizzes etc., depending on the course content. It should be continuous assessment throughout the semester and the average marks shall be considered.

iii) If the student is absent for the mid semester examination, no re-exam shall be conducted and mid semester marks for that examination shall be considered as zero.

iv) First midterm examination shall be conducted for I, II units of syllabus with one either or type question from each unit and third either or type question from both the units. The second midterm examination shall be conducted for III, IV and V units with one either or type question from each unit.

v) Final mid semester marks shall be arrived at by considering the marks secured by the student in both the mid examinations with 80% weightage given to the better mid exam and 20% to the other.

vi) If the student is absent for any one midterm examination, the final mid semester marks shall be arrived at by considering 80% weightage to the marks secured by the student in the appeared examination and zero to the other.

b) **End Examination (Only Practical's) Evaluation:**
The end examination shall be evaluated for 70 marks, conducted by the concerned laboratory teacher and a senior expert in the subject from the same department.

- Procedure: 20 marks
- Experimental work & Results: 30 marks
- Viva voce: 20 marks.

REGISTRAR
REGISTRAR
J.N.T. University Kakinada
Kakinada-533003

To
The Director of Evaluation, JNTUK Kakinada.
Copy to the Director, Academic Planning, JNTUK Kakinada.
Copy to the Secretary to Hon'ble Vice-Chancellor, JNTUK Kakinada.
Copy to the PA to the Registrar, JNTUK Kakinada.

DEPARTMENT OF CIVIL ENGINEERING

II	Year	II	Semester	L	T	P	C
Course Code:		BT24CE2208		3	0	0	0
BUILDING MATERIALS AND CONSTRUCTION (Mandatory Course)							

Course Objectives: Students will learn

1. Initiating the student with the knowledge of basic building materials and their different properties.
2. Imparting the knowledge of course pattern in masonry construction and flat roofs and techniques of forming foundation, columns, beams, walls, sloped roofs and flat roofs.
3. The student is to be exposed to the various patterns of floors, walls, different types of paints and varnishes.
4. Imparting the students with the techniques of form work and scaffolding.
5. The students should be exposed to classification of aggregates, moisture content of the aggregate.

Course Outcomes: At the end of the course, the student will be able to

CO	Statement	BL
CO1	Identify and describe various building materials and explain their functional significance in building construction.	L1
CO2	Explain the construction patterns and techniques used in masonry work.	L2
CO3	Recognize and differentiate between types of floors, walls, paints, and varnishes used in building construction..	L3
CO4	Demonstrate the techniques involved in formwork and scaffolding used for different structural elements..	L4
CO5	Classify construction aggregates and assess their properties including moisture content, grading, and suitability for various construction purposes.	L5

CO-PO Mapping:

CO/ PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	3	3	1	2	-	2	3	-	-	-	-	3
CO2	3	3	2	-	-	-		-	-	-	-	2
CO3	2	3	3	2	2	3	3	-	-	-	2	-
CO4	3	2	3	-	-	-	-	-	-	-	3	3
CO5	3	2	2	-	-	-	-	-	-	-	-	3
Level of Mapping- 3: High; 2: Moderate; 1-Low												

CO/ PSO	PSO1	PSO2
CO1	2	-
CO2	3	-
CO3	2	-
CO4	3	-
CO5	3	-

Detailed Syllabus:

UNIT I Stones, Bricks and Tiles

Properties of building stones–relation to their structural requirements, classification of stones–stone quarrying–precautions in blasting, dressing of stone, composition of good brick earth, various methods of manufacturing of bricks. Characteristics of good tile- manufacturing methods, types of tiles. Uses of materials like Aluminium, Gypsum, Glass and Bituminous materials

UNIT II Masonry

Types of masonry, English and Flemish bonds, Rubble and Ashlar Masonry. Cavity and partition walls. Wood: Structure– Properties-Seasoning of timber- Classification of various types of woods used in buildings- Defects in timber. Alternative materials for wood–Galvanized Iron, Fiber Reinforced Plastics, Steel, Aluminum.

UNIT III Lime and Cement

Lime: Various ingredients of lime – Constituents of lime stone–classification of lime–various methods of manufacture of lime.

Cement: Portland cement- Chemical Composition – Hydration, setting and fineness of cement. Various types of cement and their properties. Various field and laboratory tests for Cement.Variousing redients of cement concrete and their importance–various tests for concrete.

UNIT IV Building Components

Lintels, arches, vaults, staircases–types. Different types of floors–Concrete, Mosaic, Terrazz floors, Pitched, flat roofs. Lean to roof, Coupled Roofs. Trussed roofs–King and Queen post Trusses. R.C.C Roofs, Madras Terrace and Pre-fabricated roofs.

UNIT V Finishings & Aggregates

Finishings: Damp Proofing and water proofing materials and uses–Plastering Pointing, white washing and distempering. Paints: Constituents of a paint–Types of paints– Painting of new/old wood-Varnish. Form Works and Scaffoldings.

Aggregates: Classification of aggregates–Coarse and fine aggregates-particle shape and texture–Bond and Strength of aggregate–Specific gravity–Bulk Density, porosity and absorption–Moisture content of Aggregate-Bulking of sands–Sieve analysis.

Textbooks:

1 Building Materials, S.S.Bhavikatti, Vices publications House private ltd.
2 Building Construction, S.S.Bhavikatti, Vices publications House private ltd.
3 Building Materials, B.C.Punmia, Laxmi Publications private ltd.
4 Building Construction, B.C.Punmia, Laxmi Publications (P) ltd.

Reference Books:

1 Building Materials, S.K. Duggal, New Age International Publications.
2 Building Materials, P.C.Verghese, PHI learning (P) ltd.
3 Building Materials, M.L.Gambhir, Tata McGraw Hill Publishing Co.Ltd. New Delhi.
4 Building construction, P.C.Verghese, PHI Learning (P)Ltd.
5 Building Materials, Construction and Planning, S.Mahaboob Basha, Anuradha Publications, Chennai

Online learning resources :

1. https://www.ultratechcement.com/for-homebuilders/home-building-explained-single/descriptive-articles/raw-material-for-cement-production
2. https://onlinecourses.nptel.ac.in/noc23_ce50/preview
3. https://www.digimat.in/nptel/courses/video/105107219/L13.html